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BLISTER RUST WORK

IN THE FAR WEST

January 1 to December 31, 1930.

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Spokane Branch
Office of Blister Rust Control
618 Realty Building
Spokane, Washington

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Figure 2. $\alpha = 0.05$ (one-tail test). $\alpha = 0.05$ (two-tail test).

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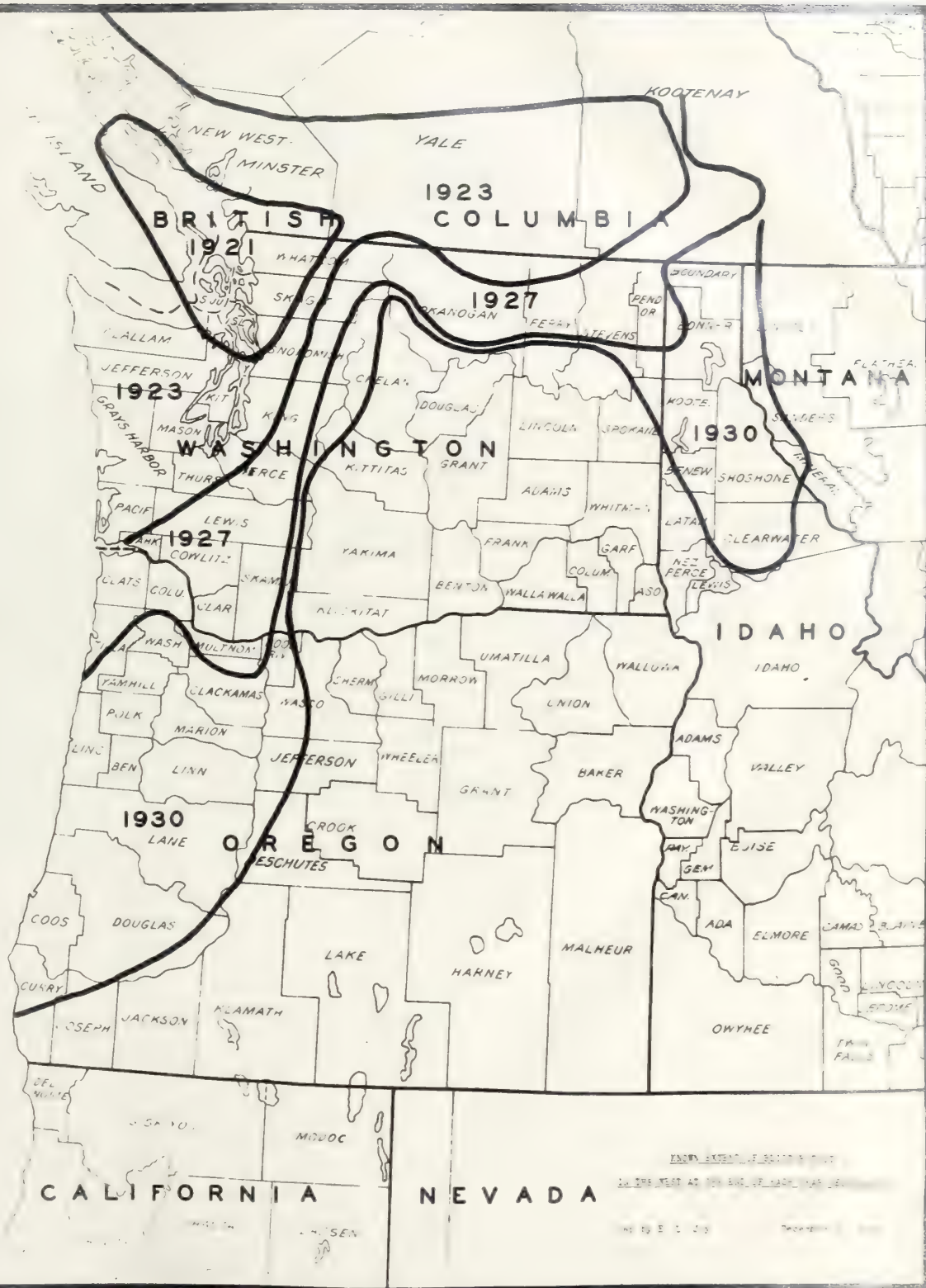
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BLISTER RUST WORK IN THE FAR WEST

January 1 to December 31, 1930

* * * * *

INTRODUCTION

Blister rust control activities in the Far West during the calendar year 1930 were divided between the newly started control operations and the continuation of the experimental program. Cooperative stream type Ribes eradication was continued in the Clearwater and Kootenai timber protective associations upon the same basis as in 1929, the Federal Government expending two dollars for every one dollar of state and private funds. Reference to the reports upon these projects will show that considerably greater headway was made during 1930 than in 1929. This was largely due to the fact that easier working conditions were encountered, although the field organizations concerned were undoubtedly more effective, due to their year of experience. This work is evidently progressing in a manner satisfactory to our cooperators. We are undoubtedly justified in the statement that each season of successful work increases the confidence of the cooperating agencies in our organization.

So far as can be seen at the present time, it appears reasonably certain that Ribes eradication will be carried to conclusion upon the white pine type lands of the national forests of Region 1, and upon at least three of the five timber protective associations of north Idaho. Should this be done we shall be assured that approximately 75% of the white pine acreage in the Inland Empire will be protected from blister rust.

During 1930 a small start was made upon control operations on national forest lands. The appropriation of \$25,000.00 secured by the Forest Service was expended upon stream type Ribes eradication in the Clearwater National Forest. For this work the Office of Blister Rust Control supplied and carried upon its payrolls one project supervisor and three camp bosses. This arrangement was in agreement with the general plan agreed upon by the Bureau of Plant Industry and the Forest Service regarding technical supervision of blister rust control operations upon national forest lands. The arrangement proved to be a most happy one in that it resulted in the most cordial of cooperative relations and in the performance of a most creditable volume of work, of \$38,125 for

The period of time during which experimental and developmental work has been done upon western blister rust control methods is now bearing fruit, not in the completion of such work but in the narrowing

FOREST SERVICE

FOREST SERVICE

* * *

FOREST SERVICE

During 1930 a small share was made upon control operations in National Forest lands. The expenditure of \$33,000,000 secured by the Forest Service was expended upon about 100,000 acres of land in the Western National Forest. For this work the Office of Military Affairs was called and carried upon the project under the supervision of the Army. The arrangement was in agreement with the Forest Service and the Bureau of Land Industry and the Forest Service. Technical supervision of military control operations was national forest lands. The arrangement proved to be a most happy one in that it resulted in the most creditable relations and in the performance of a most creditable volume of work.

So far as was known at the present time, it appears reasonably certain that these operations will be useful in connection with the war. The type lands of the National Forest of Section 1, and also at least three of the five other protective associations of north Idaho. Should this be true we shall be assured that approximately 75% of the war will be done in the inland region will be produced from inland work.

The period of time during which experimental and developmental work has been done upon military forest control methods is now bearing fruit, and in the completion of such work is the necessary

The period of time during which experimental and developmental work has been done upon military forest control methods is now bearing fruit, and in the completion of such work is the necessary

and sharper delimitation of its objectives. Experimental work during the past years has developed methods of hand eradication for the upland types and of chemical eradication for Ribes petiolare in the stream type of the Inland Empire which are at least physically feasible and sufficiently low in cost to form the basis of actual control operations. This progress will henceforth make it possible to sharply drive upon the problem of less costly eradication of R. inermis and R. lacustre in the stream type. With the concentration of effort upon this problem that will henceforth be possible, it is felt that its solution will soon be reached.

The development of control practices suitable to the sugar pine region of California was satisfactorily continued in 1930. The work during the past year consisted of re-eradication of Ribes upon areas which had previously been worked. By means of this experimental project considerable knowledge was gained of the habits of the Ribes species naturally occurring in association with sugar pine and sounder conjectures as to the ultimate form of control work in California are now possible.

By the end of 1930, 15 centers of pine infection were known to exist in the Inland Empire, 14 of these being in Idaho and one in extreme eastern Washington. 14 of these 15 centers are as yet well confined to pines growing in intimate association with stream type Ribes; the fifteenth center, occurring upon an area which has very little concentration of Ribes in the stream type, has shown a disconcerting tendency to utilize R. viscosissimum and R. lacustre as agents in the rapid intensification and spread of pine infection. While this tendency has been observed upon only one of fifteen areas, it must nevertheless serve as an indication that the period during which stream type eradication will be effective in retarding the spread and intensification of pine infection will not continue for many years. This fact should be interpreted to mean that the stream type eradication program should be pushed to completion at the earliest possible moment, and that upland type eradication should then be undertaken upon a large scale.

During the calendar year of 1930 the Western Branch of the Office of Blister Rust Control operated upon the basis of funds available from two Federal fiscal years, as follows:

For the entire fiscal year 1930 the applicable appropriation was "30133.14, Salaries and Expenses, Bureau of Plant Industry, Blister Rust Control, 1930" in the amount of \$238,195 for western blister rust control work. From this appropriation funds in the amount of \$45,442.19 were allotted for the period January 1, 1930 to June 30, 1930 as follows, together with \$10,000 additional which was made available from funds originally allotted for eastern blister rust control work:

For the Period
1/1/30 to 6/30/30

Project	
A. Delaying spread of blister rust	
1. Eradication of cultivated black currants in California.....	\$1,442.68
2. Field surveys in northwestern states to determine location of dangerous centers of pine infection and to follow the natural advance and establishment of blister rust in the northern area.....	7,536.23
3. Field surveys in Oregon.....	1,214.30
B. Development and application of local control	
1. Federal lands in Washington, Idaho and northwestern Montana.....	18,427.35
2. Local control on state and private lands in Idaho, two dollars for dollar cooperation between Federal Government and timber owners.....	23,527.80
3. Studies of local control and recheck of previously eradicated areas, Oregon.....	3,531.64
4. Studies of local control and its costs in California.....	3,702.06
5. Control reconnaissance and Ribes survey, California sugar pine areas.....	1,531.20
C. Experimental work on chemical eradication of Ribes and studies on Ribes ecology.....	
	17,934.83
D. Educational work.....	
	2,763.60
E. Field supervision, maintenance of field office, miscellaneous supplies.....	
	14,630.00
Total.....	\$96,462.19

From the total appropriation of \$133,195 for western blister rust control work for the entire fiscal year 1930, the sum of \$32,155 was allotted to the Office of Forest Pathology for investigative work. Other miscellaneous allotments for the entire fiscal year were as follows: General control (maintenance of Washington Office) \$19,710; to Office of Mycology \$540; 1% Bureau Reserve \$2,165.

From July 1, 1930 to December 31, 1930 the applicable appropriation was "31133.14, Salaries and Expenses, Bureau of Plant Industry, Blister Rust Control, 1931" in the amount of \$238,195 (for the entire fiscal year 1931) allotted as follows:

From the appropriation "31133.14, Salaries and Expenses, Bureau of Plant Industry, Blister Rust Control, 1931" the sum of \$1,000 for the entire fiscal year 1931 was allotted to the Western Branch of the

For the Period
1914-1915

[illegible]

Project		For the Period 7/1/30 to 6/30/31
A. Delaying spread of blister rust		
1. Field surveys in northwestern states to determine location of dangerous centers of infection and to follow the natural advance and establishment of blister rust in the northern area.....		\$17,718.32
2. Field surveys in Oregon.....		2,500.00
3. Field surveys in California.....		4,820.00
B. Development and application of local control		
1. Federal lands in Washington, Idaho and northwestern Montana.....		27,092.62
2. Local control on state and private lands in Idaho, two dollars for one dollar cooperation between Federal Government and timber owners....		40,000.00
3. Local control on state lands, Montana.....		1,000.00
4. Studies of local control and recheck of previously eradicated areas, Oregon.....		5,345.00
5. Studies of local control and its costs in California.....		12,212.00
6. Control reconnaissance and Ribes survey, California sugar pine areas.....		5,689.00
C. Investigative work, Office of Forest Pathology.....		22,155.00
D. Experimental work on chemical eradication of Ribes and studies on Ribes ecology.....		39,461.66
E. Educational work.....		5,950.00
F. Field supervision, maintenance of Spokane office, miscellaneous supplies.....		27,526.40
G. Miscellaneous		
General control.....	\$19,710.00	
Mycology.....	550.00	
2% Departmental Reserve.....	2,200.00	
1% Bureau Reserve.....	2,165.00	
Special Treasury Reserve.....	2,000.00	
		<u>26,625.00</u>
Total.....		\$238,193.00

From the appropriation "31133.25, Salaries and expenses, Bureau of Plant Industry, Barberry Eradication, 1931" the sum of \$6,500 for the entire fiscal year 1931 was allotted to the Western Branch of the Bureau.

FOR THE YEAR
1934

1. Field surveys in Northwestern states to determine location of important sources of information and to obtain the names and addresses of persons who are in the Northwest area.....	17,750.00
2. Field surveys in Oregon.....	5,000.00
3. Field surveys in California.....	4,250.00
4. Development of application of local control	
1. Local control in Washington, Idaho and Northwestern Montana.....	10,000.00
2. Local control in Idaho and private lands in Idaho, two dollars for one dollar cooperation between Federal Government and private owners.....	40,000.00
3. Local control on state lands, Nevada.....	1,000.00
4. Studies of local control and protection of Nevada.....	2,000.00
5. Studies of local control and protection in California.....	10,000.00
6. Central research program and other surveys California.....	5,000.00
7. Investigative work, Bureau of Forest Technology.....	25,000.00
8. Experimental work on forest protection of Idaho and other states.....	20,000.00
9. Educational work.....	5,000.00
10. Field investigation, maintenance of a forest station, educational exhibits.....	20,000.00
11. Publications.....	10,000.00
12. General account.....	10,000.00
13. Salary.....	50,000.00
14. Travel.....	2,000.00
15. Printing.....	2,000.00
16. Postage.....	2,000.00
17. Rental.....	2,000.00
18. Miscellaneous.....	2,000.00
19. Total.....	200,000.00

From the appropriation \$100,000, \$10,000 was transferred to the account of Forest Research, Oregon Experiment Station, 1934, and \$90,000 was transferred to the account of Forest Research, California Experiment Station, 1934.

Office of the Director of the Department of the Interior, Bureau of the Geological Survey, Washington, D.C.

The organization of the work and the personnel of the various divisions of the Department of the Interior, Bureau of the Geological Survey, Washington, D.C.

1. Introduction

1.1. The Department of the Interior, Bureau of the Geological Survey, Washington, D.C.

2. Project Description

2.1. The project is a study of the geology of the State of California, with particular reference to the geology of the San Francisco Bay area.

2.2. The project is a study of the geology of the State of California, with particular reference to the geology of the San Francisco Bay area.

2.3. The project is a study of the geology of the State of California, with particular reference to the geology of the San Francisco Bay area.

2.4. The project is a study of the geology of the State of California, with particular reference to the geology of the San Francisco Bay area.

2.5. The project is a study of the geology of the State of California, with particular reference to the geology of the San Francisco Bay area.

f. Educational Work, Kermit Miller, Agent, assisted by Miller Cowling, Agent, ~~San Francisco~~

g. Studies on Spread of the Rust and Damage to Pine. H. N. Putnam, Associate Pathologist, assisted by E. L. Joy, Junior Forester; R. E. Myers and C. W. Chapman, Agents.

Dr. A. B. Roberts, Moscow, Idaho

h. Experimental Chemical Eradication. H. R. Offord, Agent, assisted by R. P. d'Urbal, Assistant Chemist; G. H. Van Atta, Mrs. I. E. Webber, George E. Draper, Louis S. Keyser, Clarence R. Quick, Fred F. Staat, Robert W. Vance and Jack A. Vogtmann, Agents; and Miss Frances Greenfield, Stenographer.

3. State Leaders

a. Montana, C. H. Johnson, Assistant Pathologist,

b. Oregon, L. N. Goodding, Associate Pathologist, assisted by Miss D. L. Anderson, Agent.

c. California, G. A. Root, Associate Pathologist, assisted by project leader W. V. Benedict, Assistant Forester, with his assistants, T. H. Harris, Junior Forester (Eradication), and D. R. Miller, Junior Forester (Reconnaissance); F. A. Patty, Assistant Pathologist (Ribes Ecology); Stenographic work performed by Miss M. J. Freithke, Agent.

4. Clerical Work

Roy Calhoun, Junior Administrative Assistant (Transferred to Barberry Eradication 2/1/30).

R. L. MacLeod, Agent, assisted by A. H. Glasgow, Agent.

Miss M. L. McFold, Senior Clerk and Temporary Special Disbursing Agent, assisted by Mrs. E. M. Jump, Clerk and Mrs. M. C. Bowdy, Clerk.

Mrs. L. E. Klatt, Clerk

Mrs. E. K. Anderson, Junior Typist

Miss Catherine Ryan, Junior Clerk-Stenographer,

Miss Alice M. Fellows, Under Clerk-Typist (Transferred Veterans' Bureau 5/10/30).

Miss Marie V. Lynch, Under Clerk-Typist.

5. Collaborators

H. B. Barss, Corvallis, Ore.

Dr. J. P. Bennett, Berkeley, Calif.

Dr. Carl C. Spring, Los Angeles, Calif.

5. Collaborators (Contd)

A. O. Garrett, Salt Lake City, Utah
Dr. F. H. Goodspeed, Berkeley, Calif.
Dr. D. E. Hoagland, Berkeley, Calif.
Dr. E. E. Hubert, Moscow, Idaho
B. O. Longyear, Ft. Collins, Colorado
Rutledge Parker, Missoula, Montana
F. P. Sipe, Corvallis, Ore.

Paragraph W-6 of the Memorandum of Understanding described above contains the following:

"For the fiscal year 1926, the Bureau of Plant Industry shall contribute in value approximately \$5,000, the Montana State Department of Agriculture approximately \$5,000, the Montana State Forestry Department approximately \$1,200, the School of Forestry, University of Montana, approximately \$800, and the Northern Montana Forester Association shall contribute in value approximately \$1,000; thereafter the amount to be contributed by each shall be determined and agreed upon by supplemental arrangements."

In accordance with the foregoing provision, it is hereby agreed that the Blackfoot Forester Association will be added to those agencies who are participating in which the School of Forestry shall contribute in value for the fiscal year ending June 30, 1926, there will be contributed in value by the Montana State Department of Agriculture approximately \$4,000, by the Montana State Forestry Department approximately \$1,000, by the School of Forestry, University of Montana, approximately \$800, by the Northern Montana Forester Association approximately \$1,000, by the Blackfoot Protective Association

Colleagues (List)

A. O. Gertzel, Mill Lane, N.Y., U.S.A.
Dr. E. E. Bennett, University, Calif.
Mr. D. E. Bennett, University, Calif.
Mr. E. E. Bennett, University, U.S.A.
H. O. Bennett, U.S. Marine, Colorado
Mildred E. Bennett, U.S. Marine, Colorado
R. E. Bennett, University, U.S.A.

to the U.S. Marine, U.S.A.
U.S. Marine, U.S.A.

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approximately \$1,000,000. BLISTER RUST CONTROL WORK IN MONTANA
1930

Blister rust control activities in Montana were continued as a cooperative project between the Bureau of Plant Industry and the Montana Department of Agriculture, Montana Forestry Department, School of Forestry University of Montana, Northern Montana Forestry Association, and the Blackfoot Protective Association. There is given below the amendment to the basic memorandum of understanding, which was drawn up to cover the cooperative work for the fiscal year 1931 beginning July 1, 1930:

(s) Amendment

to the Director, Montana Forestry Department
AMENDMENT TO

MEMORANDUM OF UNDERSTANDING

Effective July 1, 1927

Between

THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF PLANT INDUSTRY
and the
MONTANA STATE DEPARTMENT OF AGRICULTURE - - - MONTANA STATE FORESTRY
DEPARTMENT - - - THE SCHOOL OF FORESTRY, UNIVERSITY OF MONTANA - - -
and the NORTHERN MONTANA FORESTRY ASSOCIATION

Cooperative work in Controlling White-Pine Blister Rust
in
MONTANA

* * *

Paragraph F-6 of the Memorandum of Understanding described above contains the following:

"For the fiscal Year 1928, the Bureau of Plant Industry shall contribute in value approximately \$6,000, the Montana State Department of Agriculture approximately \$5,000, the Montana State Forestry Department approximately \$1,200, the School of Forestry, University of Montana, approximately \$300, and the Northern Montana Forestry Association shall contribute in value approximately \$1,000; thereafter the amount to be contributed by each shall be determined and agreed upon by supplemental correspondence."

In accordance with the foregoing provision, it is mutually agreed that the Blackfoot Protective Association will be added to those agencies who are cooperating to secure the control of white-pine blister rust in Montana and that for the fiscal year ending June 30, 1931, there will be contributed in value by the Montana State Department of Agriculture approximately \$4,000, by the Montana State Forestry Department approximately \$1,700, by the School of Forestry, University of Montana, approximately \$300, by the Northern Montana Forestry Association approximately \$1,000, by the Blackfoot Protective Association

028

1. The first of these is the fact that the Government has been unable to secure the necessary funds to carry out its policy of maintaining the value of the pound at parity with the dollar. This has been due to a variety of factors, including the fact that the Government has been unable to secure the necessary foreign exchange to finance its operations.

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THE UNITED STATES DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C. 20250

100-443887-100

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"For the fiscal year 1970, the Bureau of Land Management
will continue its efforts to acquire additional land.
The acquisition program will include the following:
1. The acquisition of 10,000 acres of land in the
State of Alaska, the amount of funding, \$1,000,
of which \$500,000 will be used for the purchase of
land, and \$500,000 will be used for the purchase of
other resources. The amount to be spent by each
shall be determined and agreed upon by agreement."

W. J. C. S. 1968

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[illegible]

WILKES REIMBURSEMENT, BLISTER RUST, 1931.

approximately \$1,000, and by the United States Department of Agriculture, Bureau of Plant Industry, through its Office of Blister-rust Control, approximately \$11,000 in connection with cooperative blister-rust-control work in Montana.

Date: Efforts to reduce the protection signature: and various other

at it is gradually taking shape. The various stages of

already as (s) A. H. Stafford this and in the present
Commissioner, Montana Department of Agriculture

July 26 - 30

(s) Rutledge Parker
State Forester, Montana Forestry Department,

(s) T. C. Spaulding
Dean, School of Forestry, University of Montana

June 4, 1930

(s) A. L. Boersma
Secretary, Northern Montana Forestry Association

(s) Roscoe Haines
Secretary, Blackfoot Protective Association

1/9/31

(s) Wm. A. Taylor
Chief, Bureau of Plant Industry

medium to heavy.....	1926	\$5.00
Chemical eradication of medium to heavy.....	1926	\$1,000
Combined cost of both.....	1926	\$1,000
cost of 100.00 per acre on sample plots	1926	\$10,000
and pulling, sawing, and burning, etc.		
medium and heavy.....	1929	\$13,800
Cutting, piling and burning brush.....	1930	\$8,000

A comparison of figures indicates that the method employed in 1926 was the most efficient and of greatest value in the control of Ribes.

Cutting, piling and burning brush as practiced in 1930 is a most expensive method and is justifiable only when it has been necessary to give immediate protection to a territory or some similar area where no disease was to be feared. The attack by the blister rust. For further protection, the brush was removed this year and been fenced and the be converted into a pasture for grazing Government deer. The cost of this operation will eventually be balanced by value derived from grazing.

RIBES ERADICATION, SEVENAC NURSERY, HAUGAN, MONTANA

By
C. E. Johnson
Associate Pathologist

Our efforts to reduce the protection zone around Sevenac Nursery to a Ribes free state are gradually taking shape. A measureable degree of success has already been attained toward this end and up to the present time no difficulties have been encountered which in any way threaten defeat of our plans.

At Haugan the following methods of Ribes eradication have been practiced: (1) chemical spraying (power and knapsack), (2) hand pulling, (3) knapsack spraying followed by broadcast burning, and (4) cutting, piling and burning brush without spraying. Costs must always be considered in the practical application of any method of Ribes eradication. The following figures are on a comparable basis since they represent costs arrived at during the initial and experimental stages of each operation:

<u>Method</u>	<u>Year</u>	<u>Cost Per Acre</u>
Hand eradication on minor drainages		
Ribes light to medium.....	1928	\$13.513
Hand eradication on sample plots Ribes		
medium to heavy.....	1928	55.00
Chemical eradication Ribes medium to		
heavy.....	1928	29.082
Combined hand and chemical excluding the		
cost of \$55.00 per acre on sample plots	1928	20.285
Hand pulling, spraying and burning Ribes		
medium and heavy.....	1929	13.675
Cutting, piling and burning brush.....	1930	68.96

A comparison of figures indicates that the method employed in 1929 shows the lowest cost of operation in medium and heavy concentrations of Ribes.

Cutting, piling and burning brush as practiced in 1930 is a most expensive method and is justifiable only when it becomes necessary to give immediate protection to a nursery or some similar area where no chance can be taken from attack by the blister rust. The greater portion of the area from which the brush was removed this year has been fenced and will be converted into a pasture for grazing Government pack stock. The cost of Ribes suppression will eventually be balanced by values derived from grazing.

1900

question:

Year	Amount	Description
1935	18.85	Hand pulling, spraying and burning Rice medium and heavy.
1936	30.25	Cost of \$55.00 per acre on sample plots
1937	32.08	Heavy.
1938	32.08	Chemical eradication Rice medium to medium to heavy.
1939	32.00	Hand eradication on sample plots Rice
1940	12.11	Hand eradication on minor drainage

of Ribes.

[illegible]



Dense brush sprayed and burned August 1929. Brome grass planted April 1930. Some Ribes sprouts from crowns but no germination of seedlings. Brush dead and decaying.



Brush sprayed and burned August 1929. Brome grass planted April 1930. Some Ribes sprouts from crowns but no germination of seedlings. Brush dead and decaying.



Brush sprayed 1928. Burned July 1929. Timothy and Red Top planted April 1930. Extremely heavy germination of R. inerme occurred with grass. Plot heavily grazed but no eradication performed. Inspection October 1930 revealed practically 100% extermination or suppression of R. inerme seedlings.



Severe burn in heavy windfall and dense R. inerme. Complete destruction of all bushes and seeds. Clover was planted April 1930. Good germination was secured, but died after attaining a growth of about 1 inch.

Along the main drainages in the vicinity of Cavenac Nursery approximately 130 acres, which are classed as permanent ribes sites, have been cleared and burned and are ready for the next treatment which, according to plans and preparation, should be sowed to grass to form a permanent turf. Experiments have been conducted with the following grasses: timothy, red top, clover, Kentucky blue grass, red canary grass, slender wheat and a brome grass. An excellent turf was established by a mixture of timothy and clover. Such a combination can be used successfully along the streams at Haugan. Blue grass is slow in getting started, but forms a good sod. The ingredients of most mixtures should contain some blue grass. Red canary grass made the most vigorous growth of any grass sown, but it is a new species which must demonstrate its ability to maintain itself and spread. It withstands drought very well. The slender wheat and brome grass have readily germinated on the drier sites. Early observations indicate they would not spread so well as the other grasses. Clover and timothy are the grasses most widely grown in the region.

All grasses sown during the 1930 season are apparently supplanting ribes. There is also evidence of ribes suppression. In August, 1929 an area classed as heavy R. inerme and brush was fired. In the spring of 1930 timothy was sown on a 1/20th acre plot. The outcome was a good stand of grass and total absence of R. inerme seedlings. Three sprouts from roots were found. On a similar area following a medium burn timothy and clover seed were sown. An extremely heavy germination of ribes appeared with the grass. Toward the end of the season all clusters of ribes seedlings had disappeared. In October only 22 ribes seedlings were in evidence. The plot was well grazed, but also well protected by a medium stand of dead willow. It is hardly possible that all clusters of R. inerme seedlings could have been eradicated by stock. There was stronger evidence of ribes suppression.

The cost of removing brush from a permanent ribes site in the future will undoubtedly be that cost necessary to kill a good portion of the brush by spraying, and at the same time raise the inflammability of the brush sufficiently high to insure destruction by burning.

PERMANENT RIBES SUPPRESSION AT SAVENAC NURSERY,
HAUGAN, MONTANA

By
Harry F. Geil
Agent

INTRODUCTION

Control work at the Savenac Nursery, Haugan, Montana, was not strictly a Ribes re-eradication job but a combination of Ribes re-eradication and clean-up work. Part of the area had been partially cleared of Ribes in 1928 and reworked in 1929, and a part of the re-eradication consisted of burning over the dense concentrations of brush and Ribes that had been sprayed with chemicals in 1928. Therefore plans were made to cover a wide enough area in such a manner that the nursery's 5-needled pines would be fully protected from any danger of infection by blister rust. Of course it is known that follow-up work will have to be done periodically in the future to take care of seedlings and other re-growth of Ribes that will come in following all disturbance.

The season's work consisted of going over the area previously worked extending the protection zone to a mile beyond the nursery limits on all stream type, and of cutting and piling the brush on areas covered with dense concentrations of brush and Ribes.

Although data were taken on all Ribes killed, such information is of little importance on this job now, as the number and species of Ribes and the number of feet of live stem remaining is what determines the degree of protection.

The results of the 1929 burning indicated very clearly that it is a successful method of eliminating dense concentrations of Ribes from areas where brush is thick. Therefore it was decided to clear certain stream type areas adjacent to the nursery of all brush. Arrangements were made with the Forest Service whereby they cooperated in this brush clearing operation.

BRUSH CLEARING

The cutting and piling of brush was started in April with a small crew which was gradually increased to 24 men. At the end of June this work was suspended until September 1, after which a crew of six men was employed for about two weeks.

The men employed at this work were secured locally, being ranchers, woodsmen and men whom the Forest Service employ on fire protection during the summer.

[Faint handwritten notes at the bottom of the page]

AC 170 0002741

degrees of protection

1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 26

protection during the summer.



W.629 - Area on Big Creek showing dense concentrations of R. petiolare



W.638 - Area on Big Creek showing the large brush cut and piled and the small brush sprayed with chemicals preparatory to burning.

The areas from which brush was cut and piled are as follows: Savenac Creek from the St. Regis River to the north boundary of the nursery, Big Creek from the C. M. & St. P. Ry., to about one-half mile up the creek and on the St. Regis River from Langan west. An area of 70 acres was cleared.

RIBES ERADICATION

From June 15 to June 30, 8 men were employed on Ribes eradication, after which time 4 more were added. These men were kept on Ribes eradication work until the end of August when 5 of them were transferred to the brush-cutting operation. The remaining 3 finished up the regular Ribes eradication and then reworked some of the area where checking had shown the work to have been least satisfactory.

Pulling the remaining Ribes from the lower Savenac Creek after the brush had been cut was not a difficult job, and a high degree of efficiency was obtained. On St. Regis River and Big Creek where fire had gone through in 1920, working conditions were good on account of the ground being comparatively free of brush. However, a great deal of time and care was required in going over this ground due to the great number of seedlings on the area.



Figure — An area adjacent to and similar to the area shown cut and piled.

The above from which further work was done and which was as follows:
 Between 1900 and 1901, the river in the north boundary of the
 property, the street from the C. & N. R. R. to about one-half mile
 as the street and on the N. R. R. side from the river. An area of
 70 acres was cleared.

ELDER GRADATION

From June 25 to June 26, 1901, 6 men were employed on Elder gradation-
 tion. After which time a man was added. There were some small
 gradations were made until the end of August when 2 men were employed
 to the gradation operation. The remaining 2 finished up the gradation
 Elder gradation and then finished some of the work which had
 shown the work to have been least satisfactory.

During the summer of 1901 the lower stream of the river
 was graded and some of the work was done on the upper part of
 the stream. On the 25th of June the 2 men were left
 had some work done in 1901. Working on the river was not on account of the
 ground being somewhat low in 1901. However, a great deal of the
 and care was required in order that the stream be in the best condition
 of seedlings on the area.



W.716 - Typical stream type on Savenac Creek showing the dense growth of willows and alders which average 20 feet in height. Heavy concentrations of R. petiolare and R. inerme form the understory.



W.583 - An area adjacent to and similar to W.716 with brush cut and piled.

TABLE NO. 1

RESULTS OF PESTS AND REMEDIATION

Area	Acres	Ribes pulled										Totals		
		R. petiolare					R. inermis							
		Seed-lings	Others	Total	Per acre	Seed-lings	Others	Total	Per acre	Seed-lings	Others	Total	Per Acre	
Savannah Creek	131.5	2,890	2,385	5,275	47.5	10,476	19,373	29,849	226.8	13,356	22,758	36,114	274.4	
St. Regis River	24.6	770	2,580	3,350	12.8	43,357	36,514	89,871	361.3	44,137	32,534	83,701	294.1	
Big Creek	72.7	926	2,438	3,364	47.2	29,803	10,801	57,604	696.1	40,739	13,139	54,038	743.3	
Timber Creek	77.0	50	117	177	6.5	4,079	2,278	6,357	83.5	4,129	2,405	6,534	85.0	
Dry Creek	48.3	3,137	3,809	7,046	146.4	3,451	2,327	13,778	284.5	6,588	11,215	19,804	410.0	
Totals or Ave.	354.2	7,923	12,719	20,642	36.4	101,175	78,453	179,628	313.4	109,009	91,182	200,191	354.8	

FOR THE YEAR

THE BOARD OF DIRECTORS

No.	Name	Address	1910				Total	Remarks
			Jan	Feb	Mar	Apr		
1	John Doe	123 Main St	100.00	100.00	100.00	100.00	400.00	
2	Jane Smith	456 Elm St	200.00	200.00	200.00	200.00	800.00	
3	Robert Brown	789 Oak St	150.00	150.00	150.00	150.00	600.00	
4	Mary White	101 Pine St	120.00	120.00	120.00	120.00	480.00	
5	James Green	202 Cedar St	180.00	180.00	180.00	180.00	720.00	
6	Elizabeth Black	303 Birch St	140.00	140.00	140.00	140.00	560.00	
7	William Gray	404 Walnut St	160.00	160.00	160.00	160.00	640.00	
8	Anna Lee	505 Spruce St	110.00	110.00	110.00	110.00	440.00	
9	George Hall	606 Ash St	130.00	130.00	130.00	130.00	520.00	
10	Patricia King	707 Hickory St	170.00	170.00	170.00	170.00	680.00	
11	Richard Scott	808 Sycamore St	190.00	190.00	190.00	190.00	760.00	
12	Barbara Adams	909 Poplar St	105.00	105.00	105.00	105.00	420.00	
13	Thomas Wilson	1010 Magnolia St	125.00	125.00	125.00	125.00	500.00	
14	Sarah Evans	1111 Dogwood St	145.00	145.00	145.00	145.00	580.00	
15	Michael Roberts	1212 Redwood St	165.00	165.00	165.00	165.00	660.00	
16	Linda Taylor	1313 Cypress St	185.00	185.00	185.00	185.00	740.00	
17	Christopher Miller	1414 Juniper St	205.00	205.00	205.00	205.00	820.00	
18	Nancy Davis	1515 Fir St	115.00	115.00	115.00	115.00	460.00	
19	Kevin Jones	1616 Hemlock St	135.00	135.00	135.00	135.00	540.00	
20	Amanda Wilson	1717 Laurel St	155.00	155.00	155.00	155.00	620.00	
21	Brandon Lee	1818 Dogwood St	175.00	175.00	175.00	175.00	700.00	
22	Stephanie King	1919 Sycamore St	195.00	195.00	195.00	195.00	780.00	
23	Jonathan Scott	2020 Poplar St	215.00	215.00	215.00	215.00	860.00	
24	Karen Adams	2121 Magnolia St	100.00	100.00	100.00	100.00	400.00	
25	Gregory Evans	2222 Dogwood St	120.00	120.00	120.00	120.00	480.00	
26	Michelle Roberts	2323 Redwood St	140.00	140.00	140.00	140.00	560.00	
27	Timothy Taylor	2424 Cypress St	160.00	160.00	160.00	160.00	640.00	
28	Rebecca Miller	2525 Juniper St	180.00	180.00	180.00	180.00	720.00	
29	Christopher Davis	2626 Fir St	200.00	200.00	200.00	200.00	800.00	
30	Nicole Jones	2727 Hemlock St	220.00	220.00	220.00	220.00	880.00	
31	Matthew Wilson	2828 Laurel St	240.00	240.00	240.00	240.00	960.00	
32	Olivia Lee	2929 Dogwood St	260.00	260.00	260.00	260.00	1040.00	
33	Ethan King	3030 Sycamore St	280.00	280.00	280.00	280.00	1120.00	
34	Sophia Scott	3131 Poplar St	300.00	300.00	300.00	300.00	1200.00	
35	Isaac Adams	3232 Magnolia St	320.00	320.00	320.00	320.00	1280.00	
36	Grace Evans	3333 Dogwood St	340.00	340.00	340.00	340.00	1360.00	
37	Henry Roberts	3434 Redwood St	360.00	360.00	360.00	360.00	1440.00	
38	Abigail Taylor	3535 Cypress St	380.00	380.00	380.00	380.00	1520.00	
39	Lucas Miller	3636 Juniper St	400.00	400.00	400.00	400.00	1600.00	
40	Chloe Davis	3737 Fir St	420.00	420.00	420.00	420.00	1680.00	
41	Robert Jones	3838 Hemlock St	440.00	440.00	440.00	440.00	1760.00	
42	Victoria Wilson	3939 Laurel St	460.00	460.00	460.00	460.00	1840.00	
43	Benjamin Lee	4040 Dogwood St	480.00	480.00	480.00	480.00	1920.00	
44	Penelope King	4141 Sycamore St	500.00	500.00	500.00	500.00	2000.00	
45	Samuel Scott	4242 Poplar St	520.00	520.00	520.00	520.00	2080.00	
46	Madeline Adams	4343 Magnolia St	540.00	540.00	540.00	540.00	2160.00	
47	David Evans	4444 Dogwood St	560.00	560.00	560.00	560.00	2240.00	
48	Charlotte Roberts	4545 Redwood St	580.00	580.00	580.00	580.00	2320.00	
49	William Taylor	4646 Cypress St	600.00	600.00	600.00	600.00	2400.00	
50	Amelia Miller	4747 Juniper St	620.00	620.00	620.00	620.00	2480.00	
51	James Davis	4848 Fir St	640.00	640.00	640.00	640.00	2560.00	
52	Isabella Jones	4949 Hemlock St	660.00	660.00	660.00	660.00	2640.00	
53	Robert Wilson	5050 Laurel St	680.00	680.00	680.00	680.00	2720.00	
54	Elizabeth Lee	5151 Dogwood St	700.00	700.00	700.00	700.00	2800.00	
55	Michael King	5252 Sycamore St	720.00	720.00	720.00	720.00	2880.00	
56	Sarah Scott	5353 Poplar St	740.00	740.00	740.00	740.00	2960.00	
57	Christopher Adams	5454 Magnolia St	760.00	760.00	760.00	760.00	3040.00	
58	Nicole Evans	5555 Dogwood St	780.00	780.00	780.00	780.00	3120.00	
59	Brandon Roberts	5656 Redwood St	800.00	800.00	800.00	800.00	3200.00	
60	Stephanie Taylor	5757 Cypress St	820.00	820.00	820.00	820.00	3280.00	
61	Jonathan Miller	5858 Juniper St	840.00	840.00	840.00	840.00	3360.00	
62	Karen Davis	5959 Fir St	860.00	860.00	860.00	860.00	3440.00	
63	Gregory Jones	6060 Hemlock St	880.00	880.00	880.00	880.00	3520.00	
64	Michelle Wilson	6161 Laurel St	900.00	900.00	900.00	900.00	3600.00	
65	Timothy Lee	6262 Dogwood St	920.00	920.00	920.00	920.00	3680.00	
66	Rebecca King	6363 Sycamore St	940.00	940.00	940.00	940.00	3760.00	
67	Christopher Scott	6464 Poplar St	960.00	960.00	960.00	960.00	3840.00	
68	Nancy Adams	6565 Magnolia St	980.00	980.00	980.00	980.00	3920.00	
69	Matthew Evans	6666 Dogwood St	1000.00	1000.00	1000.00	1000.00	4000.00	
70	Olivia Roberts	6767 Redwood St	1020.00	1020.00	1020.00	1020.00	4080.00	
71	Ethan Taylor	6868 Cypress St	1040.00	1040.00	1040.00	1040.00	4160.00	
72	Sophia Miller	6969 Juniper St	1060.00	1060.00	1060.00	1060.00	4240.00	
73	Benjamin Davis	7070 Fir St	1080.00	1080.00	1080.00	1080.00	4320.00	
74	Chloe Jones	7171 Hemlock St	1100.00	1100.00	1100.00	1100.00	4400.00	
75	Robert Wilson	7272 Laurel St	1120.00	1120.00	1120.00	1120.00	4480.00	
76	Elizabeth Lee	7373 Dogwood St	1140.00	1140.00	1140.00	1140.00	4560.00	
77	Michael King	7474 Sycamore St	1160.00	1160.00	1160.00	1160.00	4640.00	
78	Sarah Scott	7575 Poplar St	1180.00	1180.00	1180.00	1180.00	4720.00	
79	Christopher Adams	7676 Magnolia St	1200.00	1200.00	1200.00	1200.00	4800.00	
80	Nicole Evans	7777 Dogwood St	1220.00	1220.00	1220.00	1220.00	4880.00	
81	Brandon Roberts	7878 Redwood St	1240.00	1240.00	1240.00	1240.00	4960.00	
82	Stephanie Taylor	7979 Cypress St	1260.00	1260.00	1260.00	1260.00	5040.00	
83	Jonathan Miller	8080 Juniper St	1280.00	1280.00	1280.00	1280.00	5120.00	
84	Karen Davis	8181 Fir St	1300.00	1300.00	1300.00	1300.00	5200.00	
85	Gregory Jones	8282 Hemlock St	1320.00	1320.00	1320.00	1320.00	5280.00	
86	Michelle Wilson	8383 Laurel St	1340.00	1340.00	1340.00	1340.00	5360.00	
87	Timothy Lee	8484 Dogwood St	1360.00	1360.00	1360.00	1360.00	5440.00	
88	Rebecca King	8585 Sycamore St	1380.00	1380.00	1380.00	1380.00	5520.00	
89	Christopher Scott	8686 Poplar St	1400.00	1400.00	1400.00	1400.00	5600.00	
90	Nancy Adams	8787 Magnolia St	1420.00	1420.00	1420.00	1420.00	5680.00	
91	Matthew Evans	8888 Dogwood St	1440.00	1440.00	1440.00	1440.00	5760.00	
92	Olivia Roberts	8989 Redwood St	1460.00	1460.00	1460.00	1460.00	5840.00	
93	Ethan Taylor	9090 Cypress St	1480.00	1480.00	1480.00	1480.00	5920.00	
94	Sophia Miller	9191 Juniper St	1500.00	1500.00	1500.00	1500.00	6000.00	
95	Benjamin Davis	9292 Fir St	1520.00	1520.00	1520.00	1520.00	6080.00	
96	Chloe Jones	9393 Hemlock St	1540.00	1540.00	1540.00	1540.00	6160.00	
97	Robert Wilson	9494 Laurel St	1560.00	1560.00	1560.00	1560.00	6240.00	
98	Elizabeth Lee	9595 Dogwood St	1580.00	1580.00	1580.00	1580.00	6320.00	
99	Michael King	9696 Sycamore St	1600.00	1600.00	1600.00	1600.00	6400.00	
100	Sarah Scott	9797 Poplar St	1620.00	1620.00	1620.00	1620.00	6480.00	

COST OF OPERATION

Expense Items	Operation		
	Re-eradication	Brush Clearing	Totals
Salaries	\$3,026.94	\$2,069.29	\$5,096.23
Cost of Animal Subsistence	1,073.45	627.29	1,700.74
Transportation	114.41	32.52	146.97
Equipment	38.48	27.86	66.34
Miscellaneous	16.72	1.55	18.27
Totals	\$4,270.00	\$2,758.51	\$7,028.51

	Man Days	Acres	Cost	Per Acre
Re-eradication	205.5	54.2	\$4,270.00	\$ 7.57
Brush Clearing	642.5	40.0	\$2,758.51	\$ 68.96

of five men made up the unit, with four men working in line and the fifth man working behind the line and checking all the ground covered. A string line was used as a guide to prevent overlapping of ground covered.

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COOPERATIVE LOCAL CONTROL
MONTANA, 1930

The project, although by C. H. Johnson, Associate Pathologist

INTRODUCTION

The year 1930 marks the initial undertaking and attempt to cooperatively protect white pine from attack by the blister rust. The work was conducted jointly by the State of Montana and the United States Department of Agriculture on state and federal lands and extended over the period from June 16 to August 22.

Crew	Size	PURPOSE	Number of men	Total
(1) To initiate cooperative local control measures for the protection of white pine stands in Montana. (2) To determine by practical work the cost of such protection. (3) To develop a trained personnel for future operations.				

LOCATION OF WORK

The eradication of stream type Ribes was done in T. 28 N., R. 19 W., and T. 27 N., R. 19 W., Montana Principal Meridian, and particularly in the drainages of Echo Creek, Noley Creek, Krause Creek, Birch Creek, Rock Creek, Station Creek. In addition, some eradication work was done along old logging roads and on a camp and mill site.

METHOD EMPLOYED

The method of eradication consisted of hand pulling. A crew of five men made up the unit, with four men working in line and the fifth man working behind the line and checking all the ground covered. A string line was used as a guide to prevent overlapping of ground worked.

DESCRIPTION OF AREA AND GROWING CONDITIONS

The stand is classed as a white pine-large-Douglas fir type, with white pine predominating or in excess of 15% of the stand. Areas of mature lodgepole exist, but this species has reached its maximum growth and is being replaced by white pine, ranging from reproduction to the pole stage. The principal Ribes species eradicated were R. lacustre and R. viscosissimum. The stream type could not be classed as particularly brushy, and as a whole represented very favorable working conditions. R. lacustre averaged from 50 to 100 per acre along streams and from 100 to 500 per acre along roads and on an area classed as a camp and mill site.

GENERAL INFORMATION

1. NAME

2. ADDRESS

3. PHONE

DETAILS

The first thing was the initial investigation and attempt to
determine the exact location of the building. The
investigation was conducted by the police and the
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RESULTS

The project, although small, has given protection to a fine stand of white pine covering approximately 15,000 acres. The cost of protection for the general region has been determined. Public sentiment in favor of protection against blister rust has been awakened.

The rust was coming in from the west and it is not possible to prevent infection. All infections TABLE NO. 1 have been very heavy, and the loss of five or six leaves a year. The cost of control is about \$13.33 per acre. COST OF COOPERATIVE BLISTER RUST CONTROL, MONTANA, 1930

Crew Organization	Salaries	Sub- sis- tence	Trans- por- tation	Supplies & Equipment	Total Cost	Acreage worked	Cost Per Acre Worked
C.H. Johnson J.L. Ashbaugh and crew of 4 men	\$1,155.45	\$371.79	\$31.90	\$14.09	\$1,573.19	472	\$13.33

TABLE NO. 2

RESULTS OF COOPERATIVE RIBES ERADICATION MONTANA, 1930

Area	Acres	Ribes Pulled - By Species					
		R. visc.	R. lac.	Total	Per Acre		Total Per Acre
					R. visc.	R. lac.	
Noisy Creek	70	1,811	12,869	14,700	25.9	184.1	210.0
Echo Creek	96		5,280	5,280		55.0	55.0
Birch Creek *	40		3,520	3,520		163.0	163.0
Rock Creek *	15		2,600	2,600		225.0	225.0
Krause Creek	42		3,425	3,425		157.0	157.0
Station Creek *	24		3,600	3,600		150.0	150.0
Camp & Mill site	40	73	13,527	13,600	1.8	338.2	340.0
Roads and Trails	144	732	25,913	26,645	3.1	179.9	185.0
Totals or Ave.	472	2,616	75,755	79,371	5.5	156.3	168.2

*The acreage worked on Birch, Station and Rock Creeks lies within the Flathead National Forest.

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SCHEIDT, MONUMENT, 1930
COAST OF CONSERVATION DISTRICT

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*The average value in 1950, Station 1-4000 Creek 1100

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SCOUTING FOR BLISTER RUST, MONTANA, 1930

Associate Pathologist

The nature of Ribes infection in Montana would indicate that the rust was coming in from some distant infection center or points of infection. All infections found to date have been very light, consisting of five or six leaves to a bush. The general region covered by white pine reconnaissance was again scouted, with rather intensive search in the vicinity where Ribes eradication was being conducted. Four infections were found this season and all within a distance of 1-1/2 to 3 miles from Savenac Nursery. As a result of intensive scouting in the general region of Haugan the inference is that the blister rust is becoming entrenched on that portion of the Lolo National Forest drained by the St. Regis River and the southern portion of the Cabinet forest drained by the Clarks Fork River.

Cooperative Work in Controlling White-Fine Blister Rust in

Paragraph 5-6, of the Memorandum of Understanding described above contains the following:

For the fiscal Year 1914, the Bureau of Plant Industry shall contribute in value approximately \$12,000 to the support of this cooperative work, the Idaho State Department of Agriculture shall contribute in value approximately \$1,500, the University of Idaho approximately \$2,000, the Potlatch Timber Protective Association approximately \$2,800, the Clearwater Timber Protective Association approximately \$3,000, the Clear d'Flow Timber Protective Association approximately \$1,500, the East Oregon Valley Protective Association approximately \$1,800, and the Selkirk Hills Timber Protective Association approximately \$4,200; thereafter the amount to be contributed by each shall be determined and agreed upon by a duly constituted conference."

REPORT OF THE COMMISSIONER OF THE GENERAL LAND OFFICE

D. H. Johnson

Assistant Secretary

The nature of the investigation in Montana would indicate that the past was similar in fact, and that the investigation covered an entire of investigation. All investigations have been very light, consisting of five or six years in a row. The general region covered by white pine investigations was very limited, with only a few intensive search in the vicinity where the investigation was being conducted. Four investigations were made in 1904 and all within a distance of 1-1/2 miles from Helena, Montana. As a result of the investigation in the general region of Helena the investigation is that the investigation is being continued in that section of the State. The investigation is being continued in the State of Montana and the various sections of the State are being investigated by the State of Montana.

List of Investigations	
Year	Location
1904	Helena, Montana
1905	Helena, Montana
1906	Helena, Montana
1907	Helena, Montana
1908	Helena, Montana
1909	Helena, Montana
1910	Helena, Montana
1911	Helena, Montana
1912	Helena, Montana
1913	Helena, Montana
1914	Helena, Montana
1915	Helena, Montana
1916	Helena, Montana
1917	Helena, Montana
1918	Helena, Montana
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1920	Helena, Montana
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2000	Helena, Montana

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BLISTER RUST CONTROL WORK IN IDAHO

1930

Blister rust control activities in Idaho were continued as a cooperative project between the Bureau of Plant Industry and the Idaho State Department of Agriculture, University of Idaho, Idaho State Board of Forestry, Potlatch Timber Protective Association, Clearwater Timber Protective Association, Coeur d'Alene Timber Protective Association, Pend Oreille Timber Protective Association and the Priest Lake Timber Protective Association. There is given below the amendment to the basic memorandum of understanding, which was drawn up to cover the cooperative work for the fiscal year 1931 beginning July 1, 1930:

AMENDMENT TO
MEMORANDUM OF UNDERSTANDING
Effective July 1, 1927

Between
THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF PLANT INDUSTRY
and the
IDAHO STATE DEPARTMENT OF AGRICULTURE - - - UNIVERSITY OF
IDAHO - - - IDAHO STATE BOARD OF FORESTRY - - - POTLATCH TIMBER
PROTECTIVE ASSOCIATION - - - CLEARWATER TIMBER PROTECTIVE
ASSOCIATION - - - COEUR D'ALENE TIMBER PROTECTIVE ASSOCIATION
- - - PEND OREILLE TIMBER PROTECTIVE ASSOCIATION - - -
and the PRIEST LAKE TIMBER PROTECTIVE ASSOCIATION

Cooperative Work in Controlling White-Pine Blister Rust in

IDAHO

Paragraph J-6, of the Memorandum of Understanding described above contains the following:

"For the Fiscal Year 1928, the Bureau of Plant Industry shall contribute in value approximately \$78,000 to the support of this cooperative work, the Idaho State Department of Agriculture shall contribute in value approximately \$1,100, the University of Idaho approximately \$4,000, the Potlatch Timber Protective Association approximately \$3,800, the Clearwater Timber Protective Association approximately \$3,800, the Coeur d'Alene Timber Protective Association approximately \$3,800, the Pend Oreille Timber Protective Association approximately \$3,800, and the Priest Lake Timber Protective Association approximately \$4,340; thereafter the amount to be contributed by each shall be determined and agreed upon by supplemental correspondence."

work for the Forest Land and Water Conservation Act of 1921.

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* * *

Admission is free, but a donation of \$2-5 suggested.

1950-1951

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In accordance with the foregoing provisions, it is mutually agreed that for the fiscal year ending June 30, 1931, there will be contributed in value by the Idaho State Department of Agriculture approximately \$2,000.00; by the University of Idaho approximately \$4,000.00; by the Potlatch Timber Protective Association approximately \$10,000.00; by the Clearwater Timber Protective Association approximately \$10,000.00; by the Coeur d'Alene Timber Protective Association approximately \$2,300.00; by the Pend Oreille Timber Protective Association approximately \$2,300.00; by the Priest Lake Timber Protective Association approximately \$2,300.00; and by the United States Department of Agriculture, Bureau of Plant Industry, through its Office of Blister-Rust Control, approximately \$75,000.00 in connection with cooperative blister-rust-control work in Idaho.

Date:

Signature:

June 5th, 1930

(s) John S. Welch

Commissioner, Idaho State Department of Agriculture.

Sept. 8, 1930

(s) R. G. Miller

University of Idaho

June 21, 1930

(s) Ben A. Bush

State Forester, Idaho State Board of Forestry

Sept. 4th, 1930

(s) A. A. Laird

President, Potlatch Timber Protective

Association

Sept. 22d, 1930

(s) Ineo. Fohl

Secy-Treas. Clearwater Timber Protective Association.

Oct. 11th, 1930

(s) C. O. Graue

Secretary, Coeur d'Alene Timber Protective Association

Oct. 17, 1930

(s) T. L. Greer

Secretary, Pend Oreille Timber Protective Association.

Oct. 25, 1930

(s) J. S. Barron

Secretary, Priest Lake Timber Protective Association

Nov. 4, 1930

(s) Wm. A. Taylor

Chief, Bureau of Plant Industry

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RIBES ECOLOGY IN THE INLAND EMPIRE

1930

By
C. W. Waters
Agent

1928 Report.

INTRODUCTION

C. Results

The important role which the Ribes ecology work should play in the control program of the blister rust is apparent. To meet and overcome a situation effectively it is first necessary to know the various conditions which control this situation. In the case of the present problem this means a better understanding of the Ribes and their relation to the environmental influences which surround them. This involves a study of the factors which control their germination and growth, dissemination and general distribution. An exhaustive treatment of such factors should aid in perfecting efficient means of eradication and possibly the ultimate establishment of a management plan of forestry whereby the germination and growth of Ribes will be inhibited.

During the year 1930, four distinct studies were in progress. Two of these were continuations from previous years and two were initiated during the past season. They are as follows:

Controlled plot studies.

Duff mantle investigations.

Seed storage study.

Ribes seed germination tests.

Some of these studies have been carried on in part in the laboratories of the University of Idaho, with the cooperation and assistance of several members of the faculty. To them and to the University administration are due thanks for laboratory facilities and helpful assistance.

The methods and results of these several studies will be taken up individually in the order named above.

CONTROLLED PLOT STUDIES

A. Purpose

This project was designed with the purpose of investigating experimentally whether viable seeds of Ribes are present in or beneath the forest duff of different ages, or whether these viable seeds from which Ribes develop on forest areas are recently deposited through some disseminating agency such as wind, water, birds or rodents, also to determine under what conditions these seeds germinate and to what extent such plants survive.

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B. Methods

These studies were initiated in 1927 and 1928 and are described on pages 131-134 of the 1927 annual report and page 28 of the 1928 report.

C. Results

The final results of these studies are not yet organized into a form suitable to be presented in this report so that an attempt has been made only to show the continued records of current germination and survival on these plots. This is a continuation of the records as submitted on pages 28-31 of the 1929 report.

Graph No. 1, which shows the effect of different disturbances of the organic mantle on the germination and survival of volunteer *Ribes viscosissimum*, is a continuation of Graph No. 1 as shown on page 27 of the 1929 annual report.

As shown in the graph, no important changes occurred in the *Ribes* population of the several plots during the season of 1930. In practically all of the cases, there has been a gradual diminution in the number of living plants with the new germinations being insufficient to increase the total.

No appreciable increase was noted in the number of seedlings at the time of the first or spring examination for 1930 even in those plots which were not burned. This is in contrast to the results obtained for the same period for 1929.

The heavy burned plots show the most constant results since there have been very few deaths or germinations since the summer of 1929. This of course is to be expected since the number of *Ribes* seeds remaining on the plots was low following the burning process and the resulting germinations encountered very little competition.

The results at the end of the third year seem to confirm the conclusions reached at the end of 1929; namely, that in the burned plots, germination was almost complete the first year. The unburned plots, however, showed heavy additional germination the second year with but very little the third.

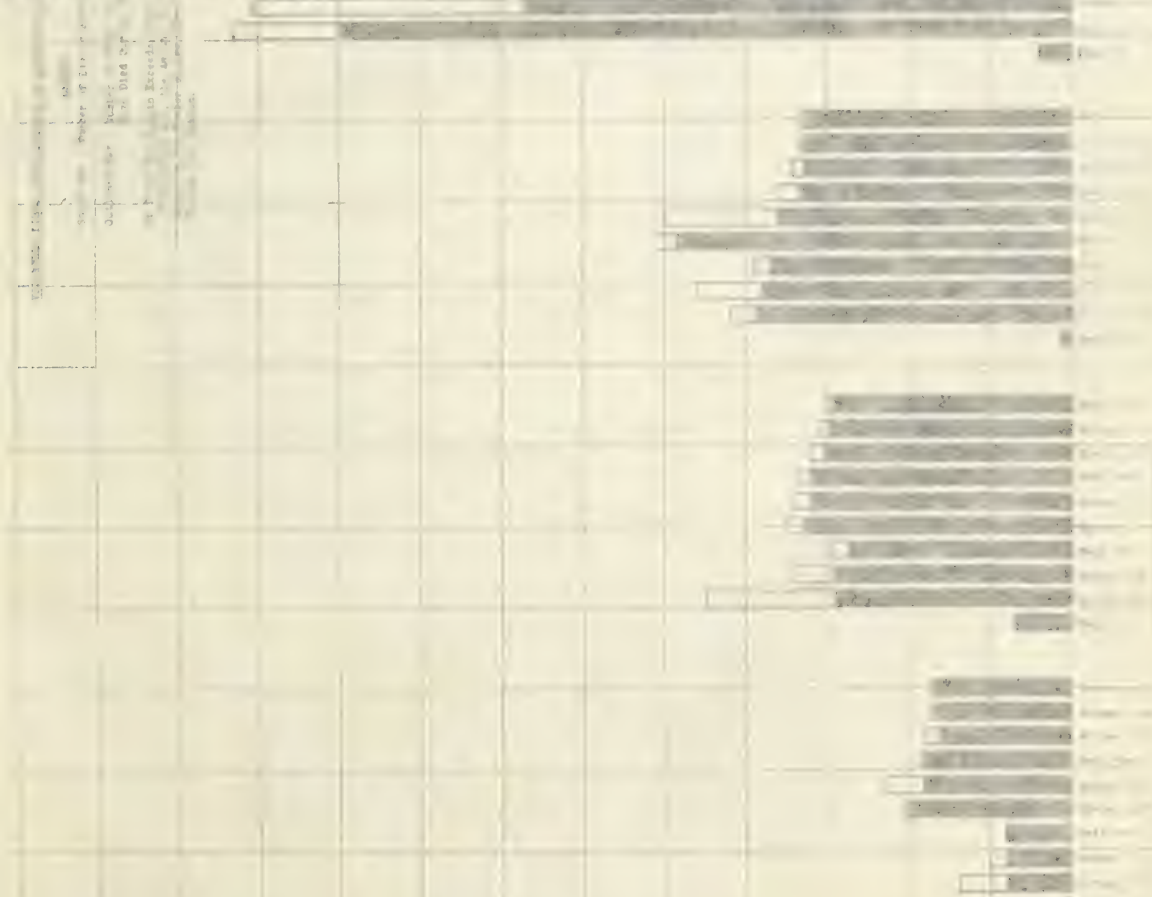
Graph No. 2 shows a comparison of the *Ribes* germination in the three differently protected blocks. This is also a continuation of Graph No. 2 as shown on page 29 of the 1929 annual report.

A comparison of the results obtained from these three differently protected blocks seems to indicate that the methods of protection accorded these blocks have had little or no influence on the numbers of *Ribes* which have germinated therein; at least during the three years in

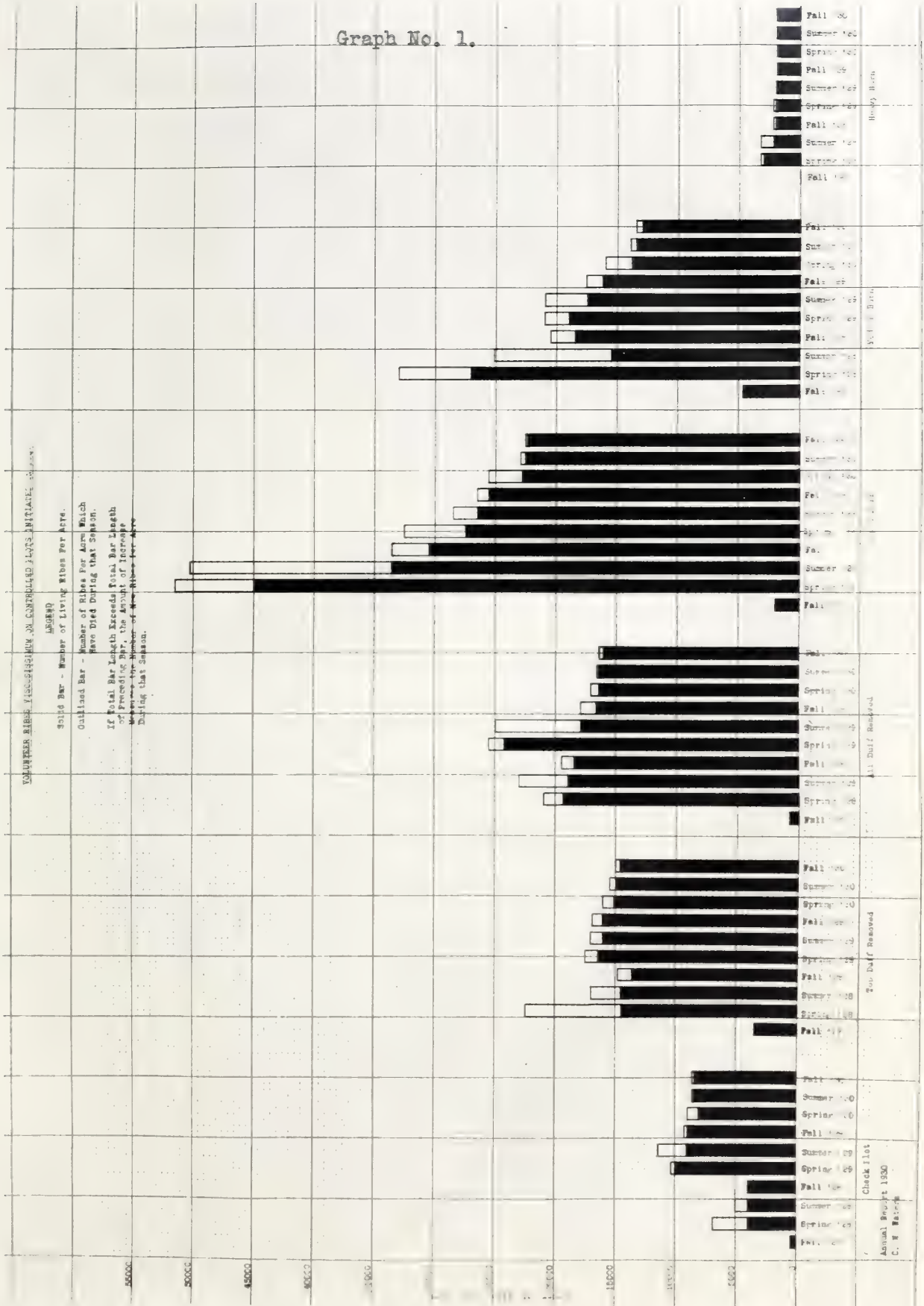
which the studies have been carried on. The presence of greater numbers of Ribes in the fully protected block III, i.e., from which both birds and rodents have been excluded, has already been explained and seemingly has nothing to do with the type of protection.

The significance to be attached to the results of this set of studies seems doubtful since they have not been attended over a long enough period of years. They do show definitely that during the three years, few, if any, viable seeds have been introduced into the unprotected plots through outside agencies, such as rodents or birds.

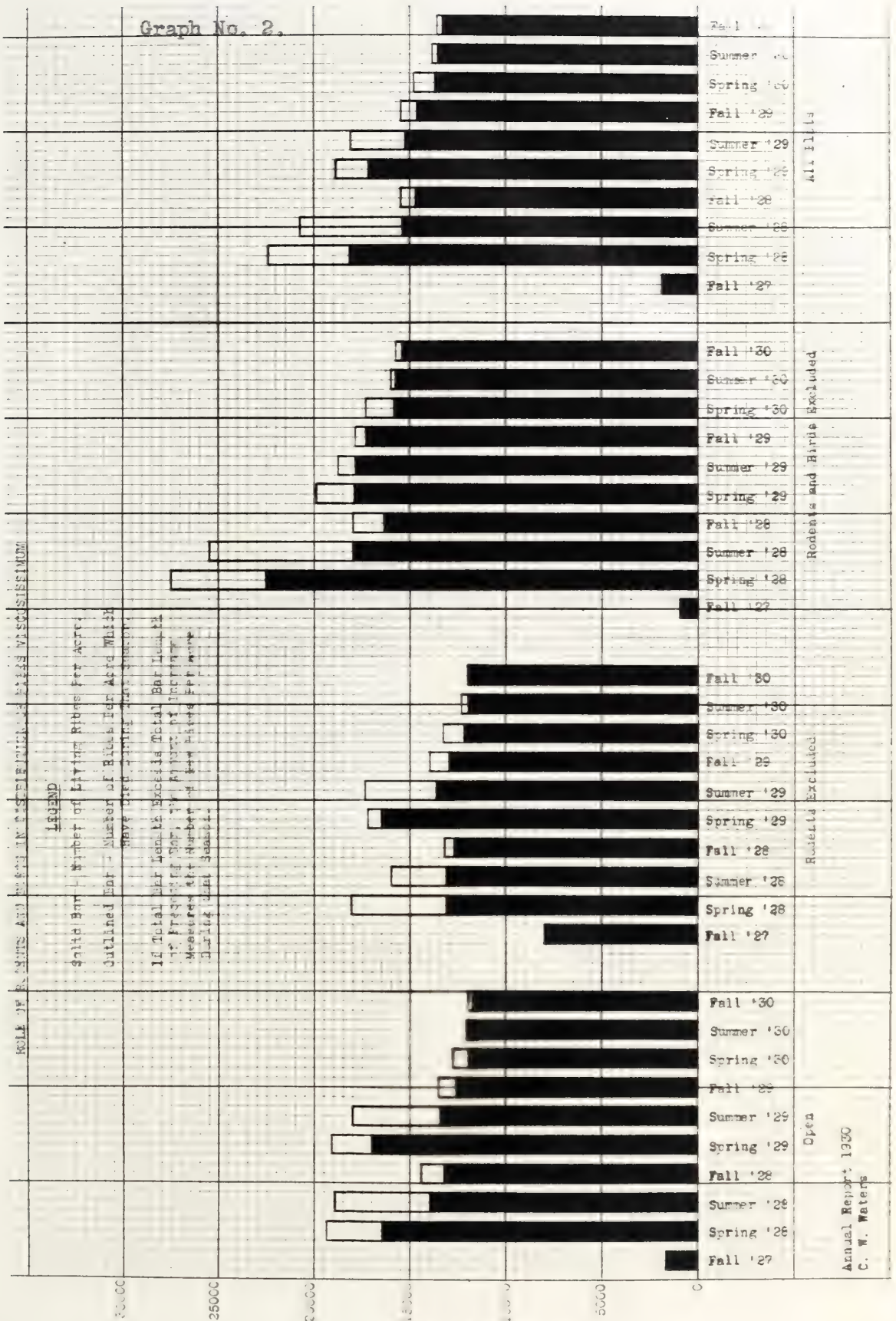
When one considers, however, the limited area covered by these blocks and the improbability of an appreciable number of seeds being introduced therein during such a brief period as three years, it becomes evident that any relation which might exist between birds and rodents and Ribes seed dissemination remains an unknown, yet possibly a very important factor in the control program.



Graph No. 1.



Graph No. 2.



DUFF MANTLE INVESTIGATIONS

A. Purpose

The purpose of these studies was to measure the depths of the duff and humus layers of the organic soil mantle in various timber age classes of the white pine region of northern Idaho with the hope of determining the rate at which the formation of inorganic soils took place in these various age classes influenced by different factors such as slope, exposure and species constitution of the stands. With such information at hand it was hoped that a clearer picture would be presented as to the fate of such Ribes seeds as might be deposited in this organic mantle at any period or periods in the development of such mantle.

B. Methods

For this study the organic mantle was divided into two layers, the duff, consisting principally of needles and small twigs unaltered as to form but beginning to decay in the lower portion, and the underlying humus, made up of decomposed vegetable material which had largely lost its original physical and vegetable texture.

Sites were selected throughout the white pine region extending from the Forest Service Experiment Station at Priest River, Idaho on the north, to the Clearwater Forest on the south. These sites were selected to represent as many age classes as possible and a variety of situations with respect to slope, exposure, etc. Descriptive data were recorded for each site on Form 24 as appended.

The measurements were taken in each case at a spot which was comparatively free from twigs and coarse litter. This was done to prevent undue disturbance of the duff. A trench, about 3 feet long, was cut with a small hand axe, extending well below the mineral soil. This trench was cut as perpendicularly as possible along the one side but sloped off on the other side to facilitate the measurements. With a sharp instrument, commonly known as a vegetable chopper, the mantle was carefully trimmed back along the perpendicular side of the trench until it presented a smooth, clean surface.

A straight stick 36" long, marked off into 12" lengths, was laid on top of the duff along the edge of the cut surface and made firm to the surface by means of a hooked stick pushed into the soil. With calipers and rule, three measurements were made of the duff and humus at 12" intervals along the stick. This gave an average of three measurements for each site. These measurements were tabulated, as indicated on the following form No. 24.

NUFF MANILA INVESTIGATIONS

I. Purpose

The purpose of these studies was to measure the degree of the drift and organic layers of the organic soil mantle in various stages of development of the waste glass region of northern Idaho with the hope of determining the rate at which the formation of inorganic soils took place in these various stages influenced by different factors such as slope, exposure and degree of vegetation of the waste. With such information it was hoped that a clearer picture would be presented as to the rate at which waste is being deposited in this organic mantle at any point or period in the development of such waste.

II. Methods

For this study the organic mantle was divided into two layers, the drift, consisting principally of needles and small twigs, and the organic, made up of decomposed vegetable material which has largely lost its original physical and vegetable texture.

Waste was selected throughout the waste glass region extending from the Forest Service Reclamation Station at Priest River, Idaho on the north, to the Clearwater River at the mouth. These sites were selected to represent as many different types of waste as possible and a variety of altitudes. This report is based on slope, exposure, etc. Descriptive data were recorded for each site as soon as possible.

The measurements were taken in each case at a spot which was conveniently located from the waste and waste layer. This was done to prevent undue disturbance of the drift. A trench, about 5 feet long, was dug with a small hand tool, extending well below the mineral soil. This trench was dug in perpendicularity as possible along the one side and sloped off on the other side to facilitate the measurement. With a sharp instrument, usually known as a vegetable chopper, the mantle was carefully broken down along the perpendicular side of the trench until it presented a smooth, clean surface.

A straight wooden pole, marked off into 12 foot lengths, was laid on top of the drift along the edge of the cut surface and was firmly secured by means of a wooden stick pushed into the soil. With a sharp instrument, the measurements were made of the drift and organic at 12 inch intervals along the stick. This gave an average of three measurements for each site. These measurements were tabulated, as follows, on the following form No. 24.

SP-BAC #24 6/7/30 (Data Sheet)

DUFF MEASUREMENTS

possible over these various age classes.

Area No. _____ Date _____ Age Class _____

Locality _____ Location of Area _____

These studies are summarized in Table No. 1 as follows:

Altitude _____ ft. Density of Stocking _____

Species - Composition _____

Exposure _____ Slope _____

Situation _____

Soil Moisture _____

Shaded _____ Partly Shaded _____ Open _____

Approx. proportion of each species of needle in duff mixture _____

(Date)

17-202 (2017/2018)

LOCATION OF SITE

Area: _____

Location of Area: _____

Altitude: _____

Vegetation: _____

Soil: _____

Water: _____

Other: _____

Notes: _____

Layer	Depth (cm or ft)	Color	Texture	Composition	Remarks
1. Soil	0-10	Brown	Loose	Clay, sand, silt	
2. Humus	10-20	Dark brown	Loose	Decayed organic matter	
3. Litter	20-30	Dark brown	Loose	Decayed organic matter	
4. Subsoil	30-40	Dark brown	Loose	Clay, sand, silt	

Observer

on the following date: 2017/2018

2,120 measurements were made, involving eight distinct age classes with the number of measurements being distributed as equally as possible over these various age classes.

C. Results

These studies are summarized in Table No. 1 as follows: No attempt has been made at this time to analyze the results from the standpoint of various site situations or constitution of the stands.

TABLE NO. 1

DEPTH OF DUFF AND HUMUS LAYERS OF THE ORGANIC SOIL MANTLE IN THE WHITE PINE REGION OF NORTHERN IDAHO BY TIMBER AGE CLASSES

Timber Age Class	Number Samples Measured	Depth of Duff in Inches	Depth of Humus in Inches	Total Depth of Organic Layer in Inches
21-40	360	0.98	0.94	1.92
41-60	330	1.04	1.05	2.09
61-80	340	0.95	0.86	1.81
81-100	320	0.99	0.89	1.88
101-120	240	0.95	0.99	1.94
121-160	190	1.10	0.98	2.08
161-200	150	1.24	1.25	2.49
200+	190	0.99	1.32	2.32
Totals or Averages	2,120	1.03	1.04	2.07

From the results as shown in the above table, it is evident that there occur no important changes in the depth of either the duff or the humus layers during the development of a timber stand from the pole stage to maturity or beyond. The duff and humus layers, regardless of timber age classes, show little variation in depth beneath stands ranging from 20 to 200 years in age. Each layer averages about one inch in depth. This is somewhat at variance, but not in discord with the findings of Griffith, et al¹, in New England white pine areas.

This seems to indicate, then, that in this organic mantle there is at work a constant decomposition of the humus to mineral soil, of duff to humus, and a continued replenishment of the duff from the forest cover.

¹The Evolution of Soils as Affected by the Old Field white pine-mixed Hardwood Succession in Central New England.

S.I.C. measurements were made, involving eight different classes with one method of measurement being identified as usually most reliable.

of Great Britain

These studies are summarized in Table No. 1 as follows:

1. *Journal of the American Medical Association*, 1997; 277: 1033-1037.

THE UNIVERSITY OF CHICAGO PRESS

Year	1960	1961	1962	1963
Total	10.8	10.7	10.1	9.5
Organic	1.2	1.3	1.4	1.5
Inorganic	9.6	9.4	8.7	8.0

[illegible]

THIS CASE IS IN THE COURT OF THE COMMON PLEAS FOR THE COUNTY OF MICHIGAN

Hardwood Succession in Central New England.

The production of duff and humus is necessarily small in the initial forest stages, attaining a quantity basis when the new forest cover is from ten to twenty years old. The lower portion of this duff decomposes fairly rapidly into humus which in turn becomes intimately associated with the mineral soil due to oxidation and the activity of various micro-organisms and fungi.

Therefore, the entire duff and humus mantle in a 40-year stand would represent for the most part the accumulation of the past twenty or twenty-five years, since the first 15 to 20 years of that stand produced very little of the organic mantle. In the succeeding one hundred years, as indicated by the figures, the accumulation of duff and humus with the corresponding decomposition of this into mineral soil goes on at a fairly uniform rate since the depth of the organic mantle does not change perceptibly. Thus the actual materials which made a 2-inch layer in the 40-year stand must comprise not more than the basal half of the organic mantle at 65 years of age, not to exceed the basal third at 90 years of age, nor more than the basal fifth of the duff and humus layer when the stand is 140 years of age. By the time the stand attains the age of 160 to 200 years or more, the layer which was the entire 2-inch organic mantle at 40 years of age, has "melted down" until it is but a very thin layer at the base of the organic mantle.

Thus if it be true that *Ribes* do not grow and produce fruits in forest stands over 30 years of age, no new seeds could be contributed directly to the accumulation of the duff after such a period. Furthermore, if wind, water, rodents and birds play only a minor part, if any, in the dissemination of *Ribes* seeds, few if any seeds could be brought into such areas from the outside. Therefore, any *Ribes* seeds present in the organic mantle in stands over 30 years of age must be located in the first 30 years accumulation of such organic mantle.

Since the results of the measurements seem to indicate that this first thirty years of duff-humus accumulation gradually diminishes in thickness at the bottom of the organic mantle until at maturity it is merely a thin layer at the bottom of years of accumulation, any *Ribes* seeds present would necessarily be found in this lower layer.

Although the results of the controlled plot studies apparently substantiate this theory, it is evident that such evidence is of a circumstantial nature and should be supported by direct and undeniable facts. In other words, if *Ribes* seeds are present in this layer, it should be possible actually to find them. This leads to the next project that was initiated and carried on in a preliminary manner during the season of 1930.

SEED STORAGE STUDY

A. Purpose

select the study

These studies were planned and carried on in an effort to ascertain, if possible, the actual existence and exact location of stored Ribes seeds in the duff and humus layers in the various areas of the white pine region of northern Idaho. As the work began, it became evident that the progress of the work would not be materially slowed up if an exact count were kept of all seeds found in the soil. Hence, in the investigation, all seeds, both conifer and non-conifer, were counted and tabulated but only the data on the non-coniferous seeds are recorded in the following report.

some of the work was first put through a series of

B. Methods

The original plan of procedure as begun and carried out during the early part of the studies, consisted in locating variously scattered sites representing, in so far as possible, the different age classes present in the areas. In these several areas a strip was selected, 80 inches in length and 8 inches wide. This strip was marked off into squares 8 inches on a side. Thus each strip yielded 10 squares arranged in linear formation.

With a wide-bladed knife each square was carefully cut around, the knife being pushed down below the level of mineral soil. With the same knife, the top layer, designated litter, was carefully peeled off the first square, placed in a paper sack and carefully labeled. The litter layer, represented a loose assemblage of twigs, needles and other debris.

Next, the second layer, the duff, was peeled off in the same manner and treated likewise. This duff layer extended down to the layer commonly known as humus. The humus layer was next peeled off, care being taken in this case to extend the collection some distance beyond the layer of mineral soil. In practically all cases the layers from a single square were 3 in number, although there were a few cases in which the humus layer was divided into two samples. These samples were designated as 1, 2 and 3, successively. The second block or square was collected in the same manner and so on for the ten squares of the strip. In labeling the various samples the strip number was indicated first; next came the block number and lastly, the sample. Thus, the first sample collected was called 1,1,1, the second 1,1,2 and so on.

In collecting the various layers of each block, care was taken to prevent any seed from sifting down from one layer to the one beneath it.

APPENDIX I

1. Introduction

The purpose of this report is to provide a detailed description of the geological features and structures observed during the field work. The study area is located in the central part of the region, and the results of the investigation are presented in the following sections. The geological structures are described in terms of their composition, structure, and distribution. The results of the investigation are presented in the following sections.

2. Methods

The methods used in this study include field observations, sampling, and laboratory analysis. The field observations were conducted in the study area, and the sampling was done in a systematic manner. The laboratory analysis was carried out to determine the mineral composition and structure of the samples. The results of the investigation are presented in the following sections.

The first part of the report describes the geological structures observed during the field work. The structures are described in terms of their composition, structure, and distribution. The results of the investigation are presented in the following sections. The second part of the report describes the methods used in the study. The methods include field observations, sampling, and laboratory analysis. The results of the investigation are presented in the following sections. The third part of the report describes the results of the investigation. The results are presented in terms of the mineral composition and structure of the samples. The results of the investigation are presented in the following sections.

The first part of the report describes the geological structures observed during the field work. The structures are described in terms of their composition, structure, and distribution. The results of the investigation are presented in the following sections.

After the ten blocks had been collected, a description of the site was taken, including such information as the age class, dominant species, ground cover, slope, nearest *Ribes* bushes, etc. Other strips were selected and collected in a similar manner; the object being to select these strips from regions presenting as wide a variety of conditions as possible.

A total of thirteen such strips were collected and the resulting samples sifted and examined for seeds as follows:

The duff samples were brought to the Soil Physics Laboratory at the University of Idaho where the remainder of the work was carried on.

Each sample was sifted through three sieves of varying sized mesh. The sample was first put through a coarse grain sieve with apertures of $1\frac{1}{2}/64$ in. This separated out the larger objects such as stones, twigs, and other of the larger portions of litter. The material which did not go through the sieve was carefully examined for any seeds that may have adhered to masses of needles or other debris before being discarded. The material which had passed through the sieve was next put through another sieve with $1/12$ " apertures. In this case also, that material which did not pass through, was carefully examined for seeds before being thrown away. Next, a fine 30-mesh sieve was used which retained all of the material except the very fine particles. However, to prevent the possible loss of many of the very small seeds, the material which had passed through the 30-mesh sieve was now put through an ordinary 40-mesh kitchen strainer. That material which was retained in the strainer was added to the material retained by the 30-mesh sieve. It was found, however, that this amount was usually very small.

The sample was now put in the 40-mesh strainer and held under a slow stream of water until practically all of the soil particles were washed through the sieve. This reduced the samples to a minimum amount of soil. The sample was then spread out on a piece of paper, labeled and set aside until it was thoroughly dry. After drying, the sample was examined with the aid of a reading glass, the method of procedure being to take only a small portion of the sample and spread it out on a sheet of white paper. All seeds recovered from the sample were placed in a small coin envelope and labeled according to the original soil sample. The remaining soil was then placed in another coin envelope and labeled the same as the original sample.

Upon the completion of the recovery of seeds from the 13 strips the number of probable *Ribes* seeds appeared so low that a different method of collection seemed desirable. It was evident that although each strip represented a total of 10 blocks, or 30 samples, the general conditions for each of these 10 blocks was practically the same. Any seedling which was discovered. The age classes and number of seeds are the same as in Table 1.

Hence, although approximately 120 blocks were examined, totaling 360 samples, there were in reality only 13 different sets of conditions represented. Therefore, during the remainder of the work, the samples were collected in a manner that would make them representative of a greater number of site conditions.

Various age classes were selected as before but instead of the blocks being grouped in strips in these sites, they were selected individually all over the site. In this manner each block represented a different situation from any of the others. 19 sites were represented and several blocks, ranging from 3 to 10 in number, were collected from each site. The samples were numbered similarly to those from the strips.

The coniferous seeds were identified and tabulated according to species but all of the others were referred to the seed laboratory at Washington for positive identification. Since the final identifications on these have not yet been received, no attempt has been made to segregate the alder seeds from the other non-coniferous forms.

C. Results

The results obtained from these counts are tabulated in the following tables: as not yet been determined, it is assumed that they will follow the same distribution curve as the non-coniferous seeds. Table No. 2 shows the number of non-coniferous seeds recovered from the three layers of the organic mantle in the various age classes. These are present in the duff or humus layer.

TABLE NO. 2

NUMBER OF NON-CONIFEROUS SEEDS IN EACH SAMPLE LAYER ACCORDING TO AGE CLASSES

TABLE NO. 2 shows the number of non-coniferous seeds recovered from the three layers of the organic mantle in the various age classes. These are present in the duff or humus layer.

Age Class	Number of Sites	Number of Samples	Number of Seeds in Litter Layer	Number of Seeds in Duff Layer	Number of Seeds in Humus Layer
			No. 1	No. 2	No. 3
20-40	10	77	241	791	1,805
40-60	4	25	18	74	252
60-100	4	27	9	34	408
100-150	7	55	18	112	357
150+	6	38	18	80	206
Totals	31	222	304	1,071	3,028

Table No. 3 shows the percentages of seeds as found in each layer according to age classes. The age classes and number of samples are the same as in Table No. 1.

Various age classes were obtained as follows: 1. 1st year class - 1950-51, 1951-52, 1952-53, 1953-54, 1954-55, 1955-56, 1956-57, 1957-58, 1958-59, 1959-60, 1960-61, 1961-62, 1962-63, 1963-64, 1964-65, 1965-66, 1966-67, 1967-68, 1968-69, 1969-70, 1970-71, 1971-72, 1972-73, 1973-74, 1974-75, 1975-76, 1976-77, 1977-78, 1978-79, 1979-80, 1980-81, 1981-82, 1982-83, 1983-84, 1984-85, 1985-86, 1986-87, 1987-88, 1988-89, 1989-90, 1990-91, 1991-92, 1992-93, 1993-94, 1994-95, 1995-96, 1996-97, 1997-98, 1998-99, 1999-00, 2000-01, 2001-02, 2002-03, 2003-04, 2004-05, 2005-06, 2006-07, 2007-08, 2008-09, 2009-10, 2010-11, 2011-12, 2012-13, 2013-14, 2014-15, 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24, 2024-25, 2025-26, 2026-27, 2027-28, 2028-29, 2029-30, 2030-31, 2031-32, 2032-33, 2033-34, 2034-35, 2035-36, 2036-37, 2037-38, 2038-39, 2039-40, 2040-41, 2041-42, 2042-43, 2043-44, 2044-45, 2045-46, 2046-47, 2047-48, 2048-49, 2049-50, 2050-51, 2051-52, 2052-53, 2053-54, 2054-55, 2055-56, 2056-57, 2057-58, 2058-59, 2059-60, 2060-61, 2061-62, 2062-63, 2063-64, 2064-65, 2065-66, 2066-67, 2067-68, 2068-69, 2069-70, 2070-71, 2071-72, 2072-73, 2073-74, 2074-75, 2075-76, 2076-77, 2077-78, 2078-79, 2079-80, 2080-81, 2081-82, 2082-83, 2083-84, 2084-85, 2085-86, 2086-87, 2087-88, 2088-89, 2089-90, 2090-91, 2091-92, 2092-93, 2093-94, 2094-95, 2095-96, 2096-97, 2097-98, 2098-99, 2099-00, 2100-01, 2101-02, 2102-03, 2103-04, 2104-05, 2105-06, 2106-07, 2107-08, 2108-09, 2109-10, 2110-11, 2111-12, 2112-13, 2113-14, 2114-15, 2115-16, 2116-17, 2117-18, 2118-19, 2119-20, 2120-21, 2121-22, 2122-23, 2123-24, 2124-25, 2125-26, 2126-27, 2127-28, 2128-29, 2129-30, 2130-31, 2131-32, 2132-33, 2133-34, 2134-35, 2135-36, 2136-37, 2137-38, 2138-39, 2139-40, 2140-41, 2141-42, 2142-43, 2143-44, 2144-45, 2145-46, 2146-47, 2147-48, 2148-49, 2149-50, 2150-51, 2151-52, 2152-53, 2153-54, 2154-55, 2155-56, 2156-57, 2157-58, 2158-59, 2159-60, 2160-61, 2161-62, 2162-63, 2163-64, 2164-65, 2165-66, 2166-67, 2167-68, 2168-69, 2169-70, 2170-71, 2171-72, 2172-73, 2173-74, 2174-75, 2175-76, 2176-77, 2177-78, 2178-79, 2179-80, 2180-81, 2181-82, 2182-83, 2183-84, 2184-85, 2185-86, 2186-87, 2187-88, 2188-89, 2189-90, 2190-91, 2191-92, 2192-93, 2193-94, 2194-95, 2195-96, 2196-97, 2197-98, 2198-99, 2199-00, 2200-01, 2201-02, 2202-03, 2203-04, 2204-05, 2205-06, 2206-07, 2207-08, 2208-09, 2209-10, 2210-11, 2211-12, 2212-13, 2213-14, 2214-15, 2215-16, 2216-17, 2217-18, 2218-19, 2219-20, 2220-21, 2221-22, 2222-23, 2223-24, 2224-25, 2225-26, 2226-27, 2227-28, 2228-29, 2229-30, 2230-31, 2231-32, 2232-33, 2233-34, 2234-35, 2235-36, 2236-37, 2237-38, 2238-39, 2239-40, 2240-41, 2241-42, 2242-43, 2243-44, 2244-45, 2245-46, 2246-47, 2247-48, 2248-49, 2249-50, 2250-51, 2251-52, 2252-53, 2253-54, 2254-55, 2255-56, 2256-57, 2257-58, 2258-59, 2259-60, 2260-61, 2261-62, 2262-63, 2263-64, 2264-65, 2265-66, 2266-67, 2267-68, 2268-69, 2269-70, 2270-71, 2271-72, 2272-73, 2273-74, 2274-75, 2275-76, 2276-77, 2277-78, 2278-79, 2279-80, 2280-81, 2281-82, 2282-83, 2283-84, 2284-85, 2285-86, 2286-87, 2287-88, 2288-89, 2289-90, 2290-91, 2291-92, 2292-93, 2293-94, 2294-95, 2295-96, 2296-97, 2297-98, 2298-99, 2299-00, 2300-01, 2301-02, 2302-03, 2303-04, 2304-05, 2305-06, 2306-07, 2307-08, 2308-09, 2309-10, 2310-11, 2311-12, 2312-13, 2313-14, 2314-15, 2315-16, 2316-17, 2317-18, 2318-19, 2319-20, 2320-21, 2321-22, 2322-23, 2323-24, 2324-25, 2325-26, 2326-27, 2327-28, 2328-29, 2329-30, 2330-31, 2331-32, 2332-33, 2333-34, 2334-35, 2335-36, 2336-37, 2337-38, 2338-39, 2339-40, 2340-41, 2341-42, 2342-43, 2343-44, 2344-45, 2345-46, 2346-47, 2347-48, 2348-49, 2349-50, 2350-51, 2351-52, 2352-53, 2353-54, 2354-55, 2355-56, 2356-57, 2357-58, 2358-59, 2359-60, 2360-61, 2361-62, 2362-63, 2363-64, 2364-65, 2365-66, 2366-67, 2367-68, 2368-69, 2369-70, 2370-71, 2371-72, 2372-73, 2373-74, 2374-75, 2375-76, 2376-77, 2377-78, 2378-79, 2379-80, 2380-81, 2381-82, 2382-83, 2383-84, 2384-85, 2385-86, 2386-87, 2387-88, 2388-89, 2389-90, 2390-91, 2391-92, 2392-93, 2393-94, 2394-95, 2395-96, 2396-97, 2397-98, 2398-99, 2399-00, 2400-01, 2401-02, 2402-03,

The results of the analysis of the samples of the material are given in the following table:

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED
DATE 05-10-2010 BY 60322 UCBAW

Year	1950	1951	1952	1953	1954	1955
1950	100	100	100	100	100	100
1951	100	100	100	100	100	100
1952	100	100	100	100	100	100
1953	100	100	100	100	100	100
1954	100	100	100	100	100	100
1955	100	100	100	100	100	100

1. The first of these is the fact that the
2. second of these is the fact that the
3. third of these is the fact that the
4. fourth of these is the fact that the
5. fifth of these is the fact that the

TABLE NO. 3

PERCENTAGES OF SEEDS IN EACH LAYER ACCORDING TO AGE CLASSES

Age Class	Per Cent of Seeds in Litter Layer No.1	Per Cent of Seeds in Duff Layer No.2	Per Cent of Seeds in Humus Layer No.3
20-40	9.6	29	63
40-60	5.0	21	73
80-100	2.0	7	90
100-150	3.0	23	73
150+	6.0	21	72
Average for all	5.0	20 19	74+

From the above results it is evident that there exists a marked difference in the number of seeds found in the various layers of the organic mantle.

Although as has been stated above, the exact number of *Ribes* seeds recovered has not yet been determined, it seems reasonable to suppose that they will follow the same distribution curve as the non-coniferous seeds taken as a whole. From observations made of the seeds it might be stated that nearly all the seeds recovered which resembled *Ribes* seeds were present in the duff or humus layer.

Therefore, judging from the results of Table No. 2, it is not unreasonable to predict that from 60 to 80 per cent of the *Ribes* seeds stored in the organic mantle are in the humus layer. These results, on superficial examination, apparently substantiate results and conclusions arrived at for the duff mantle studies, namely, that in any timber stand, regardless of age, the *Ribes* seeds are present wholly in the lower layer of the duff mantle and that this layer represents the first thirty years of duff and humus accumulation. Further, that such *Ribes* seeds as are present in this lower layer represent the accumulation only of those seeds that were produced during the first thirty years of the life of the stand, since *Ribes* do not exist in stands older than that.

However, the possibility must not be overlooked that *Ribes* seeds transported to and disseminated in a stand of timber trees, of any age and at any time, might likewise find their way to the base of the humus in a comparatively short period of time. It seems inconceivable to think that a seed the size of the *Ribes* seed might not, by the action of water and other agencies, settle down through the organic mantle and finally come to rest at the base of such layer. Comparing the position of the non-coniferous seeds in stands of various ages it is seen

TABLE 1

PERCENTAGE OF TREES IN EACH CLASS OF SIZE

CLASS OF SIZE	PERCENTAGE OF TREES IN CLASS	PERCENTAGE OF TREES IN CLASS	PERCENTAGE OF TREES IN CLASS
10-15	10	10	10
15-20	20	20	20
20-25	30	30	30
25-30	40	40	40
30-35	50	50	50
35-40	60	60	60
40-45	70	70	70
45-50	80	80	80
50-55	90	90	90
55-60	100	100	100
60-65	110	110	110
65-70	120	120	120
70-75	130	130	130
75-80	140	140	140
80-85	150	150	150
85-90	160	160	160
90-95	170	170	170
95-100	180	180	180
100-105	190	190	190
105-110	200	200	200
110-115	210	210	210
115-120	220	220	220
120-125	230	230	230
125-130	240	240	240
130-135	250	250	250
135-140	260	260	260
140-145	270	270	270
145-150	280	280	280
150-155	290	290	290
155-160	300	300	300
160-165	310	310	310
165-170	320	320	320
170-175	330	330	330
175-180	340	340	340
180-185	350	350	350
185-190	360	360	360
190-195	370	370	370
195-200	380	380	380
200-205	390	390	390
205-210	400	400	400
210-215	410	410	410
215-220	420	420	420
220-225	430	430	430
225-230	440	440	440
230-235	450	450	450
235-240	460	460	460
240-245	470	470	470
245-250	480	480	480
250-255	490	490	490
255-260	500	500	500
260-265	510	510	510
265-270	520	520	520
270-275	530	530	530
275-280	540	540	540
280-285	550	550	550
285-290	560	560	560
290-295	570	570	570
295-300	580	580	580
300-305	590	590	590
305-310	600	600	600
310-315	610	610	610
315-320	620	620	620
320-325	630	630	630
325-330	640	640	640
330-335	650	650	650
335-340	660	660	660
340-345	670	670	670
345-350	680	680	680
350-355	690	690	690
355-360	700	700	700
360-365	710	710	710
365-370	720	720	720
370-375	730	730	730
375-380	740	740	740
380-385	750	750	750
385-390	760	760	760
390-395	770	770	770
395-400	780	780	780
400-405	790	790	790
405-410	800	800	800
410-415	810	810	810
415-420	820	820	820
420-425	830	830	830
425-430	840	840	840
430-435	850	850	850
435-440	860	860	860
440-445	870	870	870
445-450	880	880	880
450-455	890	890	890
455-460	900	900	900
460-465	910	910	910
465-470	920	920	920
470-475	930	930	930
475-480	940	940	940
480-485	950	950	950
485-490	960	960	960
490-495	970	970	970
495-500	980	980	980
500-505	990	990	990
505-510	1000	1000	1000
510-515	1010	1010	1010
515-520	1020	1020	1020
520-525	1030	1030	1030
525-530	1040	1040	1040
530-535	1050	1050	1050
535-540	1060	1060	1060
540-545	1070	1070	1070
545-550	1080	1080	1080
550-555	1090	1090	1090
555-560	1100	1100	1100
560-565	1110	1110	1110
565-570	1120	1120	1120
570-575	1130	1130	1130
575-580	1140	1140	1140
580-585	1150	1150	1150
585-590	1160	1160	1160
590-595	1170	1170	1170
595-600	1180	1180	1180
600-605	1190	1190	1190
605-610	1200	1200	1200
610-615	1210	1210	1210
615-620	1220	1220	1220
620-625	1230	1230	1230
625-630	1240	1240	1240
630-635	1250	1250	1250
635-640	1260	1260	1260
640-645	1270	1270	1270
645-650	1280	1280	1280
650-655	1290	1290	1290
655-660	1300	1300	1300
660-665	1310	1310	1310
665-670	1320	1320	1320
670-675	1330	1330	1330
675-680	1340	1340	1340
680-685	1350	1350	1350
685-690	1360	1360	1360
690-695	1370	1370	1370
695-700	1380	1380	1380
700-705	1390	1390	1390
705-710	1400	1400	1400
710-715	1410	1410	1410
715-720	1420	1420	1420
720-725	1430	1430	1430
725-730	1440	1440	1440
730-735	1450	1450	1450
735-740	1460	1460	1460
740-745	1470	1470	1470
745-750	1480	1480	1480
750-755	1490	1490	1490
755-760	1500	1500	1500
760-765	1510	1510	1510
765-770	1520	1520	1520
770-775	1530	1530	1530
775-780	1540	1540	1540
780-785	1550	1550	1550
785-790	1560	1560	1560
790-795	1570	1570	1570
795-800	1580	1580	1580
800-805	1590	1590	1590
805-810	1600	1600	1600
810-815	1610	1610	1610
815-820	1620	1620	1620
820-825	1630	1630	1630
825-830	1640	1640	1640
830-835	1650	1650	1650
835-840	1660	1660	1660
840-845	1670	1670	1670
845-850	1680	1680	1680
850-855	1690	1690	1690
855-860	1700	1700	1700
860-865	1710	1710	1710
865-870	1720	1720	1720
870-875	1730	1730	1730
875-880	1740	1740	1740
880-885	1750	1750	1750
885-890	1760	1760	1760
890-895	1770	1770	1770
895-900	1780	1780	1780
900-905	1790	1790	1790
905-910	1800	1800	1800
910-915	1810	1810	1810
915-920	1820	1820	1820
920-925	1830	1830	1830
925-930	1840	1840	1840
930-935	1850	1850	1850
935-940	1860	1860	1860
940-945	1870	1870	1870
945-950	1880	1880	1880
950-955	1890	1890	1890
955-960	1900	1900	1900
960-965	1910	1910	1910
965-970	1920	1920	1920
970-975	1930	1930	1930
975-980	1940	1940	1940
980-985	1950	1950	1950
985-990	1960	1960	1960
990-995	1970	1970	1970
995-1000	1980	1980	1980
1000-1005	1990	1990	1990
1005-1010	2000	2000	2000
1010-1015	2010	2010	2010
1015-1020	2020	2020	2020
1020-1025	2030	2030	2030
1025-1030	2040	2040	2040
1030-1035	2050	2050	2050
1035-1040	2060	2060	2060
1040-1045	2070	2070	2070
1045-1050	2080	2080	2080
1050-1055	2090	2090	2090
1055-1060	2100	2100	2100
1060-1065	2110	2110	2110
1065-1070	2120	2120	2120
1070-1075	2130	2130	2130
1075-1080	2140	2140	2140
1080-1085	2150	2150	2150
1085-1090	2160	2160	2160
1090-1095	2170	2170	2170
1095-1100	2180	2180	2180
1100-1105	2190	2190	2190
1105-1110	2200	2200	2200
1110-1115	2210	2210	2210
1115-1120	2220	2220	2220
1120-1125	2230	2230	2230
1125-1130	2240	2240	2240
1130-1135	2250	2250	2250
1135-1140	2260	2260	2260
1140-1145	2270	2270	2270
1145-1150	2280	2280	2280
1150-1155	2290	2290	2290
1155-1160	2300	2300	2300
1160-1165	2310	2310	2310
1165-1170	2320	2320	2320
1170-1175	2330	2330	2330
1175-1180	2340	2340	2340
1180-1185	2350	2350	2350
1185-1190	2360	2360	2360
1190-1195	2370	2370	2370
1195-1200	2380	2380	2380
1200-1205	2390	2390	2390
1205-1210	2400	2400	2400
1210-1215	2410	2410	2410
1215-1220	2420	2420	2420
1220-1225	2430	2430	2430
1225-1230	2440	2440	2440
1230-1235	2450	2450	2450
1235-1240	2460	2460	2460
1240-1245	2470	2470	2470
1245-1250	2480	2480	2480
1250-1255	2490	2490	2490
1255-1260	2500	2500	2500
1260-1265	2510	2510	2510
1265-1270	2520	2520	2520
1270-1275	2530	2530	2530
1275-1280	2540	2540	2540
1280-1285	2550	2550	2550
1285-1290	2560	2560	2560
1290-1295	2570	2570	2570
1295-1300	2580	2580	2580
1300-1305	2590	2590	2590
1305-1310	2600	2600	2600
1310-1315	2610	2610	2610
1315-1320	2620	2620	2620
1320-1325	2630	2630	2630
1325-1330	2640	2640	2640
1330-1335	2650	2650	2650
1335-1340	2660	2660	2660
1340-1345	2670	2670	2670
1345-1350	2680	2680	2680
1350-1355	2690	2690	2690
1355-1360	2700	2700	2700
1360-1365	2710	2710	2710
1365-1370	2720	2720	2720
1370-1375	2730	2730	2730
1375-1380	2740	2740	2740
1380-1385	2750	2750	2750
1385-1390	2760	2760	2

that the numbers do not vary greatly. For example, in a forty-year-old stand 60 per cent of the seeds are found in the humus layer while in a stand of 150 years or more 72 per cent are located there. The remaining 28 per cent in the older stand are divided unequally between the duff and litter layers and would seem to represent those seeds which are in a constant state of settling down through such layers.

However, since these numbers do not represent Ribes seeds exclusively and since the samples as collected during the current season were not taken wholly from sites which could be designated as undoubtedly "Ribes free", it remains useless to draw positive conclusions. It is to be recommended, however, that such studies be continued for another season in the hope that the exact location of Ribes seeds can be determined with certainty. Such studies would not only settle this uncertain point but would also answer the question as to whether there is a continued and constant dissemination of Ribes seeds in the old as well as the very young stands of white pine.

RIBES SEED GERMINATION STUDIES

A. Purpose

The results thus far obtained from the several field studies have made evident the necessity of conducting carefully controlled laboratory studies on the various factors which control Ribes seed germination and growth. Among these factors are temperature, moisture, age of seed, degree of acidity or alkalinity of soil, and the variation in the reaction of the several species of Ribes to such factors. In addition, it is essential to follow up the germination and note the conditions which control the survival of such germinated seedlings.

With proper correlation of such laboratory and field results a more accurate picture can be drawn of the factor or complex of factors which control the germination and growth of Ribes in nature.

B. Methods

The experiment was started March 13, 1930 and discontinued September 30, 1930. Six constant temperatures and four alternating temperature combinations were used, namely, 5°C, 10°C, 15°C, 20°C, 25°C and 30°C were constant while 30°C day and 5°C night, 25°C day, 5°C night, 25°C day 10°C night, and 20°C day 5°C night were the alternating combinations. Ten sets of seeds were used: R. viscosissimum for the years 1925, 1926, 1927, 1928 and 1929; R. lacustre for the years 1927 and 1928, R. inerme for the year 1927, R. petiolare for the year 1927, and R. roezli for the year 1927. Seeds produced in 1927 were used as standard, because that year's seeds were available for each species.

Agencies are to prepare and submit, prior to the end of the fiscal year, a report on the results of their operations. The report should include a statement of the agency's mission, a description of its activities, and a statement of its accomplishments. The report should also include a statement of the agency's financial position and a statement of its personnel resources. The report should be submitted to the Department of the Interior, Bureau of Land Management, and the Bureau of Reclamation. The report should be submitted in triplicate, one copy to each of the three agencies, and one copy to the Department of the Interior. The report should be submitted by the end of the fiscal year, or by the end of the month of December, whichever is later.

However, since these results are not representative of the entire season, additional samples are collected during the current season. It is recommended, however, that these studies be continued for another season in the hope that the exact location of these seeds can be determined with certainty. Such studies would not only settle this uncertainty but would also answer the question as to whether these seeds are found in the vicinity of the white pine stands or white pine.

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While control the Communist in the world, more and more nations are in danger of being

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1. Reference to the year 1957 in the text of the report is not correct. The year 1957 is the year of the first session of the General Assembly of the United Nations.

Peat was used as the germination medium, and duplicate sets of seeds for each temperature were run, one set in natural peat which ran a pH of 3.7 and the other in peat neutralized by adding 5.79 grams of CaCO_3 per 100 grams of air-dry peat which ran a pH of 7.18. The peat used for this study was imported from Germany. Four grams of peat, air-dry basis, were placed in each dish, and sterilized in an autoclave at 10 pounds pressure for 45 minutes to kill any foreign seeds and any mold spores that might be present.

Sterilized water was used throughout the experiment, and the peat was kept at its saturation point. The seeds were soaked for 30 minutes in a 0.5 per cent solution of Uspulum to sterilize them, and then 50 per dish were planted. Mold, which developed in the dishes after planting, was kept down by a treatment of the Uspulum solution. All planting of seeds, watering of dishes, transferring of seedlings, etc. was done in the transfer chamber under as sanitary conditions as possible.

TABLE NO. 4

GERMINATION OF RIBES SEEDS UNDER ALTERNATING TEMPERATURES

Germination Factors		Number of Seeds Germinated by Species										
Temperature of Ovens	pH of medium	E. vis. 1925	E. vis. 1928	R. vis. 1927	E. vis. 1929	E. lac. 1927	E. lac. 1928	A. pet. 1927	A. iner. 1927	A. roez. 1927	Total	
30°C by 5°C	acid	1	1	-	-	-	-	-	1	-	3	
	Neutral	2	5	3	2	-	1	-	5	-	15	
	Total	3	6	3	2	-	1	-	6	-	21	
25°C by 10°C	Acid	-	-	-	-	2	-	-	1	-	3	
	Neutral	17	36	23	14	25	1	-	12	-	140	
	Total	17	36	23	14	27	1	-	13	-	143	
25°C by 5°C	Acid	2	4	-	-	-	-	-	2	-	8	
	Neutral	28	33	7	29	34	1	-	10	1	158	
	Total	30	37	7	29	34	1	-	12	1	177	
20°C by 5°C	Acid	1	2	2	2	1	-	-	1	-	10	
	Neutral	35	24	17	30	31	-	-	5	-	176	
	Total	36	26	19	32	32	-	-	6	-	186	
Totals	Acid	4	6	2	2	3	-	-	5	-	24	
	Neutral	83	108	50	73	90	3	-	32	1	502	
	Total	86	114	52	77	93	3	-	37	1	526	

TABLE NO. 5

GERMINATION OF RIBES SEEDS UNDER CONSTANT TEMPERATURES

Germination Factors		Number of Seeds Germinated by Species										
Temperature of Ovens	pH of Medium	E. vis. 1925	E. vis. 1926	E. vis. 1927	E. vis. 1928	R. vis. 1929	R. l. c. 1927	R. l. c. 1928	R. pet. 1927	R. inar. 1927	R. roez. 1927	Total
30°C	Acid	-	-	-	-	-	-	-	-	-	-	-
	Neutral	-	-	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	-	-	-	-	-	-	-
25°C	Acid	-	-	-	-	-	-	-	-	1	-	1
	Neutral	1	-	1	1	-	1	-	-	2	-	6
	Total	1	-	1	1	-	1	-	-	3	-	7
20°C	Acid	-	-	-	-	-	-	-	-	-	-	-
	Neutral	4	-	-	2	-	1	-	1	-	-	8
	Total	4	-	-	2	-	1	-	1	-	-	8
15°C	Acid	-	-	-	-	-	-	-	-	-	-	-
	Neutral	1	-	-	1	-	-	-	-	-	-	3
	Total	1	-	-	1	-	-	-	-	-	-	2
10°C	Acid	1	-	-	1	-	-	-	-	3	-	5
	Neutral	-	-	1	3	-	-	-	-	-	2	6
	Total	1	-	1	4	-	-	-	-	3	2	11
5°C	Acid	1	1	-	1	1	-	-	-	6	2	11
	Neutral	-	1	5	8	-	-	-	-	-	5	19
	Total	1	2	5	9	1	-	-	-	6	7	30
Totals	Acid	2	1	-	2	1	-	-	-	9	2	17
	Neutral	6	1	7	15	-	2	-	1	2	7	41
	Total	8	2	7	17	1	3	-	1	11	9	68

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TABLE NO. 6

PERCENTAGE OF GERMINATION UNDER MOST FAVORABLE CONDITIONS*

Germination Factors		Per Cent of Germination by Species							
Temperature of Ovens	pH of Medium	R. vis. 1925	R. vis. 1926	L. vis. 1927	E. vis. 1928	L. vis. 1929	L. lac. 1927	L. iner. 1927	Average
20°-5° C	Neutral	70.0	46.0	34.0	68.0	60.0	62.0	10.0	50.0
25°-5° C	Neutral	56.0	52.0	14.0	66.0	58.0	68.0	22.0	47.71
25°-10° C	Neutral	34.0	24.0	46.0	72.0	28.0	50.0	24.0	34.71
Average	Neutral	53.33	40.67	31.33	68.67	48.67	60.0	18.0	44.31

*Using most favorable temperatures and species that showed the highest percentage of germination.

TABLE NO. 3

RELATIONSHIP BETWEEN TEMPERATURE AND SOLUBILITY OF GASES

Temperature of Gas		Solubility of Gas		Temperature of Gas		Solubility of Gas		Temperature of Gas		Solubility of Gas	
°C	F	g/l	g/100 ml	°C	F	g/l	g/100 ml	°C	F	g/l	g/100 ml
0	32	0.03	3.0	10	50	0.02	2.0	20	68	0.01	1.0
10	50	0.02	2.0	20	68	0.01	1.0	30	86	0.005	0.5
20	68	0.01	1.0	30	86	0.005	0.5	40	104	0.002	0.2
30	86	0.005	0.5	40	104	0.002	0.2	50	122	0.001	0.1
40	104	0.002	0.2	50	122	0.001	0.1	60	140	0.0005	0.05
50	122	0.001	0.1	60	140	0.0005	0.05	70	158	0.0002	0.02

*Values are approximate and may vary slightly with different conditions of pressure and purity of gases.

TABLE NO. 7

MONTHLY GERMINATION OF LEBIS SLIPS ACCORDING TO MEDIUM AND TEMPERATURE

Month of Germination	pH of Medium	Temperature of Ovens										Total	Per Cent Germination Based on Total Germ.
		5°	10°	15°	20°	25°	30°	35°	40°	45°	50°		
March (13 to 31)	Acid	-	-	-	-	-	-	-	-	-	-	-	0.0
	Neutral	-	-	1	1	2	-	2	3	7	1	17	2.9
	Total	-	-	1	1	2	-	2	3	7	1	17	2.9
April	Acid	-	-	-	-	1	-	10	3	-	2	16	2.7
	Neutral	2	-	-	-	1	-	71	69	63	1	207	35.5
	Total	2	-	-	-	2	-	81	72	63	2	323	38.2
May	Acid	2	1	-	-	-	-	-	4	-	1	8	1.4
	Neutral	2	-	-	-	-	-	42	43	53	6	136	21.6
	Total	4	1	-	-	-	-	42	47	53	7	134	23.0
June	Acid	7	1	-	-	-	-	-	1	2	-	12	2.1
	Neutral	9	5	-	5	2	-	27	31	20	4	103	17.6
	Total	16	6	-	5	2	-	27	32	22	4	116	19.7
July	Acid	1	1	-	-	-	-	-	-	-	-	2	0.3
	Neutral	2	1	-	1	1	-	15	9	7	5	41	7.0
	Total	3	2	-	1	1	-	15	9	7	5	43	7.3
August	Acid	1	2	-	-	-	-	-	-	-	-	3	0.5
	Neutral	4	-	1	1	-	-	18	14	10	1	48	6.4
	Total	5	2	1	1	-	-	18	14	10	1	52	8.9
Totals	Acid	11	2	-	-	1	-	10	8	3	3	41	7.0
	Neutral	19	6	2	3	3	-	175	169	140	19	342	53.0
	Total	30	11	2	3	4	-	185	177	143	21	384	100.0

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C. Results

Table No. 4 shows the results of alternating temperatures on the germination of the different sets of seeds. When the totals, by temperatures, are compared, the combination of 20°C and 5°C shows the best results; but by individual dishes the 25°C and 5°C combination has the highest percentage of germination in any one dish. The table indicates that the 30°C and 5°C combination is too high for successful germination. This table also compares the germination of five consecutive years of seeds for R. viscosissimum. The results indicate that there is no appreciable loss of viability due to the different ages of the seeds of this species.

Table No. 5 compares the results of the constant temperatures on the germination of the different sets of seeds. There were not enough seeds germinated to be even indicative; but this table, when compared with Table 1, shows that an alternating temperature combination is preferred to a constant temperature. It appears that the 5°C and 10°C chambers were the best of the constant temperatures; but this can be explained, at least partially so, by the fact that with the facilities at that time, these two ovens could not be held constant and would vary about 5°C on either side of their intended constant temperatures which, in reality, made them a more or less alternating combination.

Table No. 6 gives a summary of the results obtained when the most favorable combinations of factors were employed. Using the alternating temperatures 20°C and 5°C with neutral peat as a medium, seven sets of seeds showed an average of 50 per cent germination. R. viscosissimum seeds produced in 1928, germinated in neutral peat, showed an average of 68.67 per cent for the three sets of alternating temperatures. This is the highest average obtained for any seeds.

Table No. 7 gives the germination for each temperature condition by the month. For the alternating temperature ovens, the peak of germination was reached in April and gradually decreased until August. During that month, there was a very slight increase due to extremely hot weather for three days, which caused both the 20°C and 25°C to go up 15°C and 10°C, respectively, during the day. The peak of germination in the constant temperature ovens was reached in June, or the 4th month after planting.

TABLE NO. 8

MONTHLY GERMINATION OF RIBES SEEDS ACCORDING TO MEDIUM AND SPECIES

Month of Germination	pH of Medium	Species of Ribes Seeds										Per Cent Germination Based on Total Germination	
		R. vis.					R. lac.						
		1926	1927	1928	1929	1930	1927	1928	1929	1930	1931		
March (12 to 31)	Acid	-	-	-	-	-	-	-	-	-	-	-	0.0
	Neutral	6	6	5	-	-	-	-	-	-	-	17	2.9
	Total	6	6	5	-	-	-	-	-	-	-	17	2.9
April	Acid	1	2	4	2	1	-	-	-	-	-	16	2.7
	Neutral	32	20	63	28	24	1	1	-	-	-	207	33.5
	Total	33	22	67	30	25	1	1	-	-	-	223	36.2
May	Acid	3	-	3	-	-	-	-	-	-	-	6	1.4
	Neutral	21	13	23	26	26	1	1	-	-	-	126	21.6
	Total	24	13	26	26	26	1	1	-	-	-	132	23.0
June	Acid	2	1	1	1	1	-	-	-	-	-	13	2.1
	Neutral	20	13	13	10	23	-	-	-	-	-	103	17.6
	Total	22	14	14	11	24	-	-	-	-	-	116	19.7
July	Acid	-	-	-	-	-	-	-	-	-	-	2	0.3
	Neutral	4	5	10	5	7	-	-	-	-	-	41	7.0
	Total	4	5	10	5	7	-	-	-	-	-	43	7.3
August	Acid	-	-	-	-	-	-	-	-	-	-	3	0.5
	Neutral	5	5	10	6	13	-	-	-	-	-	49	8.4
	Total	5	5	10	6	13	-	-	-	-	-	52	8.9
Totals	Acid	6	3	8	3	3	-	-	-	-	-	41	7.0
	Neutral	38	67	123	73	83	2	2	1	-	-	543	92.0
	Total	94	70	131	76	86	2	2	1	-	-	584	100.0

THE INFLUENCE OF TEMPERATURE ON GERMINATION

Table No. 8 gives the germination of species by the month. Of the sets of seeds that showed an appreciable germination, all but one reached their peak, both in acid and neutral peat, in April, and gradually decreased with a slight exception for August until the experiment was discontinued.

The two outstanding facts brought out by these studies are: first, that alternating temperature combinations are much better for germination than constant temperature, since about 90 per cent of the seeds germinated were in the four alternating temperature combinations; and second, that neutral peat is a more favorable germination medium than acid peat since 98 per cent of the total germinated seeds were in the neutral medium.

One current year's seeds were used--*H. viscosissimum* for 1929. Observations showed that they started germinating later than the other sets of seeds indicating the probable need of a rest period, but no data was taken on this phase. Further studies are needed to determine this point.

No conclusive results have been obtained, as the study has not progressed far enough to give sufficient data. Some very good leads, however, have been uncovered which will be of aid in future studies. The study of the life history of the rust fungus, *Uromyces*, has been hampered by the fact that the rust fungus is a very delicate organism and is very easily killed by the action of the soil. In most such cases owners were the principal cause of the loss of the rust fungus. In some cases, however, with larger holdings of interested companies, were a few cases, but in many cases were caused by the fact that the rust fungus is very delicate and this procedure would not have been practicable in regions where the bulk of lands are held by these small owners, most of whom are financially overburdened.

The condition which was described just above is a serious one as far as control of white pine blister rust is concerned. Hundreds of thousands of acres of what was once the best white pine land in the inland Empire are represented. Heavy burning and reforestation following logging has reduced some of this land to a barren state except for what grass is available for grazing purposes. The loss of all, however, of the white pine reproduction ranging up to 30 or 40 years of age, much of which is as good as any in the United States, is a very serious loss to the forest. Even though it is in private hands there is no argument in favor of a national policy which permits reforestation of poorer sites on public lands and does not provide for protecting such excellent established growth on the best sites little of which can ever be classed as agricultural land.

Table 1. A given the duration of specimen by the month. The rate of growth is given in the column "Growth". All but one specimen, dated 1957, were in the "Growth" column. The rate of growth is given in the column "Growth". The rate of growth is given in the column "Growth".

The rate of growth is given in the column "Growth". The rate of growth is given in the column "Growth". The rate of growth is given in the column "Growth". The rate of growth is given in the column "Growth". The rate of growth is given in the column "Growth".

The rate of growth is given in the column "Growth". The rate of growth is given in the column "Growth". The rate of growth is given in the column "Growth". The rate of growth is given in the column "Growth". The rate of growth is given in the column "Growth".

The rate of growth is given in the column "Growth". The rate of growth is given in the column "Growth". The rate of growth is given in the column "Growth". The rate of growth is given in the column "Growth". The rate of growth is given in the column "Growth".

THE INLAND EMPIRE KIBES ERADICATION PROGRAM

By

C. C. Strong,

Associate Forester

I. Experimental Work

The rapid advance of INTRODUCTION naturally is the factor during which its effective control must be accomplished. White pine blister rust is now so generally distributed throughout the white pine areas of the Inland Empire that owners are faced with the necessity of instituting protective measures at a much earlier time than was formerly predicted. The kibes eradication activities conducted over the period since such work began have been largely experimental and aimed at developing methods whereby adequate protection to western white pine from blister rust might be secured at a minimum cost. The rapid advance of white pine blister rust has caused the experimental work to be speeded up to the maximum and actual control work to have been started on the basis of the most effective methods.

One of the important purposes in all the experimental work is to demonstrate the interest and good faith of some of the larger operating companies in north Idaho was demonstrated in 1929 when the Clearwater and Potlatch Timber Protective Associations voted, respectively, to take advantage of the cooperative financial arrangements which the Federal Government was ready to extend. Much white pine acreage, especially that not bearing merchantable material and which would be a constant financial burden to the owner due to protection, taxes, etc., even though bearing excellent stands of white pine reproduction and pole timber, would very probably not be protected. In most such cases owners were financially unable to protect against blister rust. Such lands, where intermingled with larger holdings of interested companies, were a decided handicap and in many cases were covered without the owner's assistance. However, this procedure would not have been practicable in regions where the bulk of lands are held by these small owners, most of whom are virtually bankrupt. That Control Unit cooperators have been able to do this is a fact which is a big step in the direction of the solution of the problem.

The condition which was described just above is a serious one so far as control of white pine blister rust is concerned. Hundreds of thousands of acres of what was once the best white pine land in the Inland Empire are represented. Heavy burning and reburning following logging has reduced some of this land to a barren state except for what grass is available for grazing purposes. The bulk of it, however, now supports white pine reproduction ranging up to 30 or 40 years of age, much of which is as good as any in the Inland Empire. Surely a way must be found to protect this timber. Even though it is in private hands there is no argument in favor of a national policy which permits reforestation of poorer sites on public lands and does not provide for protecting such excellent established growth on the best sites little of which can ever be classed as agricultural land.

Desired Eradication Methods.

PROJECT ACTIVITIES

Experimental and Field Equipment.

A. Experimental Work

The rapid advance of blister rust naturally limits the period during which its effective control must be accomplished. There are many problems which come up regarding crew methods, spraying machinery, the development of new ways of killing Ribes, etc., which must be solved. For this purpose a special methods project was set up some years back. As time goes on more and more problems present themselves for solution. These are immediately turned over to the methods project and a special experiment conducted to give the desired information if it cannot be obtained from existing experiments.

B. Cooperative Ribes Eradication

One of the important purposes in all the experimental Ribes eradication activities in the past was to train men to supervise such work in the future. Hence it was that when the two timber protective associations voted funds for Ribes eradication the Office of Blister Rust Control was ready to administer the work.

In 1930, when the United States Forest Service obtained an appropriation to initiate such work on national forests the Office of Blister Rust Control was ready with a trained personnel who administered the work. The National Park Service secured funds to start blister rust control on certain areas bearing valuable white pine timber in 1930 and naturally turned to this organization for trained men to supervise the job.

It is a source of much satisfaction to the Western Office of Blister Rust Control that cooperators have expressed entire approval of the business-like manner in which the work has been done.

REPORTS

There are various other lines along which it is planned to

In accordance with the plan followed in the 1929 annual report of Ribes eradication activities in the Inland Empire the individuals who directly supervised the field activities in 1930 have carefully prepared reports dealing with the work for which each was responsible. The reports follow according to the order in which they are here listed:

5700 289-272-2

[illegible]

One of the important purposes of all the work of the
organization is the fact that we have been able to
work in the future. There is now a new and
renewed vigor and energy in the work of the
Council was ready to administer the work.

[illegible]

1. The Commission found that the activities of the group were directed towards the overthrow of the Government of the United States and the establishment of a Communist regime in the United States. The Commission also found that the group was engaged in a campaign of propaganda and subversion in the United States and in other countries.

Chemical Eradication Methods.

Chemical Eradication Methods, Supplemental Report on Experimental and Field Equipment.

Ribes Eradication, National Forest.

**Preliminary Ribes Eradication Survey of the Palouse Division
give comparison of the St. Joe National Forest.**

**Preliminary Ribes Eradication Survey, Priest River Experiment
Station.**

**Cooperative Local Control Work, Clearwater Timber Protective
Association.**

power spraying was developed. It was considered best on some of the
Cooperative Local Control Work, Potlatch Timber Protective
The area was a Association-type with heavy brush and Ribes
prevailing with reasonable uniformity over a distance of eight miles.

PLANS FOR FUTURE WORK
placed in the field during the 1930 season.

Ribes eradication, by suitable methods, has proven adequate to
control blister rust under eastern conditions when carefully done. How-
ever, no one knows, nor is there any source from which such information
might be obtained, whether or not Ribes eradication by methods adapted
to conditions encountered will afford adequate protection to white pine
in the Inland Empire. To make this determination it is planned to set
up demonstration control areas in regions where the rust now is present.
It is thus hoped to show quickly how thorough a job of Ribes eradication
must be in order to constitute adequate control in the region.

determine the percentage (actual spraying time) of a blower
Recent developments along lines of chemical investigations point
to the necessity of devising new types of equipment for applying toxic
agents to Ribes. This, of course, calls for parallel experiments designed
to perfect methods of using this new equipment.

The principal purpose of this project is to develop the
There are various other lines along which it is planned to
conduct experiments. These will be covered in the methods report.

conditions have been developed. Careful observation and records of the
work and results in chemical eradication have shown that the individual
section method of spraying by which a man works alone is the most satis-
factory method. With the general plan of working developed, it appears
necessary to study the component elements of the method in order to gain
a further understanding of the problem and possible leads for improvement
of the method.

The more specific aims of the project are:

• 42-4343-6-10 (5) 1999-10-10

Approved and Forwaded: _____
Special Agent in Charge

• 1970-1971: 1970-1971, 1971-1972, 1972-1973, 1973-1974, 1974-1975, 1975-1976, 1976-1977, 1977-1978, 1978-1979, 1979-1980, 1980-1981, 1981-1982, 1982-1983, 1983-1984, 1984-1985, 1985-1986, 1986-1987, 1987-1988, 1988-1989, 1989-1990, 1990-1991, 1991-1992, 1992-1993, 1993-1994, 1994-1995, 1995-1996, 1996-1997, 1997-1998, 1998-1999, 1999-2000, 2000-2001, 2001-2002, 2002-2003, 2003-2004, 2004-2005, 2005-2006, 2006-2007, 2007-2008, 2008-2009, 2009-2010, 2010-2011, 2011-2012, 2012-2013, 2013-2014, 2014-2015, 2015-2016, 2016-2017, 2017-2018, 2018-2019, 2019-2020, 2020-2021, 2021-2022, 2022-2023, 2023-2024, 2024-2025, 2025-2026, 2026-2027, 2027-2028, 2028-2029, 2029-2030, 2030-2031, 2031-2032, 2032-2033, 2033-2034, 2034-2035, 2035-2036, 2036-2037, 2037-2038, 2038-2039, 2039-2040, 2040-2041, 2041-2042, 2042-2043, 2043-2044, 2044-2045, 2045-2046, 2046-2047, 2047-2048, 2048-2049, 2049-2050, 2050-2051, 2051-2052, 2052-2053, 2053-2054, 2054-2055, 2055-2056, 2056-2057, 2057-2058, 2058-2059, 2059-2060, 2060-2061, 2061-2062, 2062-2063, 2063-2064, 2064-2065, 2065-2066, 2066-2067, 2067-2068, 2068-2069, 2069-2070, 2070-2071, 2071-2072, 2072-2073, 2073-2074, 2074-2075, 2075-2076, 2076-2077, 2077-2078, 2078-2079, 2079-2080, 2080-2081, 2081-2082, 2082-2083, 2083-2084, 2084-2085, 2085-2086, 2086-2087, 2087-2088, 2088-2089, 2089-2090, 2090-2091, 2091-2092, 2092-2093, 2093-2094, 2094-2095, 2095-2096, 2096-2097, 2097-2098, 2098-2099, 2099-2100, 2100-2101, 2101-2102, 2102-2103, 2103-2104, 2104-2105, 2105-2106, 2106-2107, 2107-2108, 2108-2109, 2109-2110, 2110-2111, 2111-2112, 2112-2113, 2113-2114, 2114-2115, 2115-2116, 2116-2117, 2117-2118, 2118-2119, 2119-2120, 2120-2121, 2121-2122, 2122-2123, 2123-2124, 2124-2125, 2125-2126, 2126-2127, 2127-2128, 2128-2129, 2129-2130, 2130-2131, 2131-2132, 2132-2133, 2133-2134, 2134-2135, 2135-2136, 2136-2137, 2137-2138, 2138-2139, 2139-2140, 2140-2141, 2141-2142, 2142-2143, 2143-2144, 2144-2145, 2145-2146, 2146-2147, 2147-2148, 2148-2149, 2149-2150, 2150-2151, 2151-2152, 2152-2153, 2153-2154, 2154-2155, 2155-2156, 2156-2157, 2157-2158, 2158-2159, 2159-2160, 2160-2161, 2161-2162, 2162-2163, 2163-2164, 2164-2165, 2165-2166, 2166-2167, 2167-2168, 2168-2169, 2169-2170, 2170-2171, 2171-2172, 2172-2173, 2173-2174, 2174-2175, 2175-2176, 2176-2177, 2177-2178, 2178-2179, 2179-2180, 2180-2181, 2181-2182, 2182-2183, 2183-2184, 2184-2185, 2185-2186, 2186-2187, 2187-2188, 2188-2189, 2189-2190, 2190-2191, 2191-2192, 2192-2193, 2193-2194, 2194-2195, 2195-2196, 2196-2197, 2197-2198, 2198-2199, 2199-2200, 2200-2201, 2201-2202, 2202-2203, 2203-2204, 2204-2205, 2205-2206, 2206-2207, 2207-2208, 2208-2209, 2209-2210, 2210-2211, 2211-2212, 2212-2213, 2213-2214, 2214-2215, 2215-2216, 2216-2217, 2217-2218, 2218-2219, 2219-2220, 2220-2221, 2221-2222, 2222-2223, 2223-2224, 2224-2225, 2225-2226, 2226-2227, 2227-2228, 2228-2229, 2229-2230, 2230-2231, 2231-2232, 2232-2233, 2233-2234, 2234-2235, 2235-2236, 2236-2237, 2237-2238, 2238-2239, 2239-2240, 2240-2241, 2241-2242, 2242-2243, 2243-2244, 2244-2245, 2245-2246, 2246-2247, 2247-2248, 2248-2249, 2249-2250, 2250-2251, 2251-2252, 2252-2253, 2253-2254, 2254-2255, 2255-2256, 2256-2257, 2257-2258, 2258-2259, 2259-2260, 2260-2261, 2261-2262, 2262-2263, 2263-2264, 2264-2265, 2265-2266, 2266-2267, 2267-2268, 2268-2269, 2269-2270, 2270-2271, 2271-2272, 2272-2273, 2273-2274, 2274-2275, 2275-2276, 2276-2277, 2277-2278, 2278-2279, 2279-2280, 2280-2281, 2281-2282, 2282-2283, 2283-2284, 2284-2285, 2285-2286, 2286-2287, 2287-2288, 2288-2289, 2289-2290, 2290-2291, 2291-2292, 2292-2293, 2293-2294, 2294-2295, 2295-2296, 2296-2297, 2297-2298, 2298-2299, 2299-2300, 2300-2301, 2301-2302, 2302-2303, 2303-2304, 2304-2305, 2305-2306, 2306-2307, 2307-2308, 2308-2309, 2309-2310, 2310-2311, 2311-2312, 2312-2313, 2313-2314, 2314-2315, 2315-2316, 2316-2317, 2317-2318, 2318-2319, 2319-2320, 2320-2321, 2321-2322, 2322-2323, 2323-2324, 2324-2325, 2325-2326, 2326-2327, 2327-2328, 2328-2329, 2329-2330, 2330-2331, 2331-2332, 2332-2333, 2333-2334, 2334-2335, 2335-2336, 2336-2337, 2337-2338, 2338-2339, 2339-2340, 2340-2341,

1. The first part of the report is a general introduction to the project, which includes a brief history of the project and a statement of the project's purpose.

Approved: _____
Special Agent in Charge

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Goodwill Salvage Company, Inc., 1000 Broadway, New York, N.Y. 10003

PLANS FOR NUMBER 1000

It is true that the Government has been unable to control the situation in the past, but it is not true that it has been unable to control the situation in the future. The Government has the power to control the situation in the future, and it is its duty to do so.

to protect interests of the public and the environment.

[illegible]

CHEMICAL ERADICATION METHODS

By

H. E. Swanson,

Agent

2. To test all possible methods of eradication.

3. To develop new equipment.

INTRODUCTION

and to improve upon the equipment now in use. To test all new equipment. Previous to the 1929 field season, several more or less extensive comparisons and tests had been made between power and knapsack spraying methods. These comparisons consistently showed knapsack spraying to be the more satisfactory. However, confronted with the problem of stream type eradication on some 3,000,000 acres of white pine type, it was deemed advisable to continue experimenting and developing power methods until its possibilities were regarded as being exhausted. During the 1929 season, a practical, smooth running, and simplified method of power spraying was developed. It was conceded that on some of the area on which this work was done, power spraying was the more practical method. The area was a wide stream type with heavy brush and Ribes conditions prevailing with reasonable uniformity over a distance of eight miles. On account of the successful performance on this area, a power unit was placed in the field during the 1930 season.

During the month of June approximately 50 men divided into two groups. In past experiments, all comparisons were made by spraying the same area by both methods. This means of comparison was discarded in 1930 because of certain drawbacks, principally the great cost involved in covering an area twice and also because of the difficulty of getting a fair test on the method used on the second time over. During the past season, a different approach was made to the problem. A man was assigned to make some specific time studies of the component operations making up each spraying method. From these data, it is possible to determine the productive time (actual spraying time) of a laborer engaged in each method of spraying.

PURPOSE

The principal purpose of this project is to develop and improve methods of Ribes eradication in order to reduce costs and increase the efficiency of the work. In working toward this end, certain practical methods have been developed. Careful observation and analysis of the work and results in chemical eradication have shown that the individual section method of spraying by which a man works alone is the most satisfactory method. With the general plan of working developed, it becomes necessary to study the component elements of the method in order to gain a further understanding of the problem and possible leads for improvement of the method.

The more specific aims of the project are:

1. The first group of people who are not in the labor force are those who are not in the labor force for any reason. This group includes people who are not in the labor force because they are not in the labor force for any reason.

... ..

[illegible]

in each method of computing. In the method of computing the gross value of the product, the gross value of the product is computed by multiplying the quantity of the product by the unit price of the product. In the method of computing the net value of the product, the net value of the product is computed by multiplying the quantity of the product by the net price of the product. In the method of computing the average value of the product, the average value of the product is computed by dividing the gross value of the product by the quantity of the product.

The principal purpose of this project is to develop and improve methods of tissue examination in order to determine more fully the histological significance of the cells. In certain instances, the histological examination of the tissue has been made by the use of the histological section method. With the general plan of general histology, it is necessary to study the histological elements of the tissue in order to gain a further understanding of the structure and function of the tissue.

The more specific aims of the project are:

1. To study and analyze all the phases of chemical eradication methods.

2. To test all possible methods of working.

3. To develop new equipment for use in applying different chemicals and to improve upon the equipment now in use. To test all new equipment in the field. This phase of the project is handled in a supplementary report.

LOCATION AND DESCRIPTION OF AREA

The work was conducted on the Musselshell District of the Clearwater National Forest in conjunction with the control work financed by the Forest Service. The areas having the heaviest concentrations of Ribes were selected for the project on account of the work to be done with the power equipment. (See report on Ribes Eradication on National Forests for a fuller description of the area.)

ORGANIZATION OF WORK

During the month of June approximately 90 men divided among four camps were engaged in methods studies. After securing some essential data on knapsack spraying three of these units were transferred to the Forest Service for blister rust control work on July 1. For the balance of the season a 25-man camp carried on the methods work. The spraying equipment consisted of a 10-man power unit, a 5-man power unit, 10 knapsack units, and special equipment to be tested in the field.

Maintenance of the unit is described under report on Ribes Eradication on National Forests.

1. The study was conducted in the field of...

2. To test all possible methods of...

3. To develop new methods for the study of...

LOCATION AND DESCRIPTION OF AREA

The area was situated in the western part of the... The area was situated in the western part of the... The area was situated in the western part of the...

ORGANIZATION OF STUDY

The study was organized in the following manner... The study was organized in the following manner... The study was organized in the following manner...

Details of the study are given in the following...

TABLE NO. 1

STATEMENT AND ANALYSIS OF COSTS

Item	Cost
Salaries	
Supervision	\$1,244.07
Temporary men	6,407.21
Special	297.00
Subsistence	
Cooks' Salaries	828.09
Cost of food	2,103.49
Transportation of food	358.72
General Equipment	
Cost	188.20
Transportation	361.21
Spraying Equipment	
	622.43
Miscellaneous	
Supplies	106.75
Expenses	34.64
Repairs	140.00
Twine	49.20
Chemical	
Cost	885.10
Transportation	272.46
Transportation of men	346.84
Total	\$14,255.41

TABLE NO. 2

COST OF MEALS

Item	Costs
Cooks' salaries	828.09
Cost of food	2,103.49
Transportation of food	358.62
Total	\$3,289.20

*See report on direct expenditures on National Service for
 Number of meals.....9,171
 Cost per meal.....\$.363

1942

STATE OF NEW YORK

Item	Amount
Salaries	10,000.00
Expenses	5,000.00
Interest	1,000.00
Depreciation	2,000.00
Cost of 1941	1,000.00
Transportation of 1941	1,000.00
General Expenses	1,000.00
Cost	1,000.00
Transportation	1,000.00
General Expenses	1,000.00
Miscellaneous	1,000.00
Supplies	1,000.00
Repairs	1,000.00
Utilities	1,000.00
Travel	1,000.00
Insurance	1,000.00
Cost	1,000.00
Transportation	1,000.00
Transportation of 1941	1,000.00
Total	10,000.00

1942

STATE OF NEW YORK

Item	Amount
Salaries	10,000.00
Expenses	5,000.00
Interest	1,000.00
Depreciation	2,000.00
Cost of 1941	1,000.00
Transportation of 1941	1,000.00
General Expenses	1,000.00
Cost	1,000.00
Transportation	1,000.00
General Expenses	1,000.00
Miscellaneous	1,000.00
Supplies	1,000.00
Repairs	1,000.00
Utilities	1,000.00
Travel	1,000.00
Insurance	1,000.00
Cost	1,000.00
Transportation	1,000.00
Transportation of 1941	1,000.00
Total	10,000.00

1942

WORK PERFORMED AND RESULTS ACCOMPLISHED

TABLE NO. 3

CHEMICAL ERADICATION ON THE CLEARWATER NATIONAL FOREST BY METHODS

power spraying in Table No. 1. UNIT - 1930 Units No. 11 and 12 were used in power spraying on a medium concentration of Dibs, because the cost of spraying

Method	Man-Days	Gallons Chemical	Acres Sprayed	Total Cost	Data per Acre		
					Man-Days	Gallons Chemical	Cost
Power	460	12,186	316	\$4,569.23	1.46	38.5	\$14.43
Knapack	148	2,932	117	1,652.89	1.26	24.2	14.12
Total	608	15,018	433	\$6,212.12	1.40	34.7	\$14.35

TABLE NO. 4

costs have out. Also the number of units used in each method.

HAND ERADICATION ON THE CLEARWATER NATIONAL FOREST BY METHODS UNIT, 1931

Type	Man-Days	Acres	Total Cost	Number Ribes Pulled				Total	Data per Acre		
				R. Lec.	R. pet.	R. vis.	R. iner.		Man-Days	Ribes	Cost
Tr.	1,082	1,357	\$7,746.29	208,718	23,637	3,513	77,353	313,221	.80	231	\$5.71

power spraying

TABLE NO. 5

ERADICATION SUMMARY ON CLEARWATER NATIONAL FOREST BY METHODS UNIT, 1930*

The above Ribes-eradication units No. 11 and 12 were used in

Man-Days	Pounds Chemical	Acres Sprayed	Total Cost	Acres Partially Protected	Per Cent of Area Stream Side of Ribes	Cost per Acre to Eradicate Ribes	Cost per Acre for Partial Protection
1,030	12,700	1,357	\$13,958.41	16,200	8.38	\$10.29	\$5.862

*See Report on Ribes eradication on National Forests for a complete summary of work by all eradication units on the Clearwater National Forest. It is necessary for the type of operation which is done. In power spraying a reduced load, their performance is not as steady and uniform as in the case of the smaller units. Their consumption of gasoline is also slightly greater than that of the hand units No. 11 and 12. The former units with

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TABLE 1

ANALYSIS OF THE DATA OF THE SURVEY OF THE MICHIGAN RIVER BASIN IN 1960

Year	Area	Population	Income	Education	Health	Environment
1960	100	100	100	100	100	100
1961	100	100	100	100	100	100
1962	100	100	100	100	100	100
1963	100	100	100	100	100	100
1964	100	100	100	100	100	100
1965	100	100	100	100	100	100
1966	100	100	100	100	100	100
1967	100	100	100	100	100	100
1968	100	100	100	100	100	100
1969	100	100	100	100	100	100
1970	100	100	100	100	100	100

TABLE 2

ANALYSIS OF THE DATA OF THE SURVEY OF THE MICHIGAN RIVER BASIN IN 1960

Year	Area	Population	Income	Education	Health	Environment
1960	100	100	100	100	100	100
1961	100	100	100	100	100	100
1962	100	100	100	100	100	100
1963	100	100	100	100	100	100
1964	100	100	100	100	100	100
1965	100	100	100	100	100	100
1966	100	100	100	100	100	100
1967	100	100	100	100	100	100
1968	100	100	100	100	100	100
1969	100	100	100	100	100	100
1970	100	100	100	100	100	100

TABLE 3

ANALYSIS OF THE DATA OF THE SURVEY OF THE MICHIGAN RIVER BASIN IN 1960

Year	Area	Population	Income	Education	Health	Environment
1960	100	100	100	100	100	100
1961	100	100	100	100	100	100
1962	100	100	100	100	100	100
1963	100	100	100	100	100	100
1964	100	100	100	100	100	100
1965	100	100	100	100	100	100
1966	100	100	100	100	100	100
1967	100	100	100	100	100	100
1968	100	100	100	100	100	100
1969	100	100	100	100	100	100
1970	100	100	100	100	100	100

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DISCUSSION AND ANALYSIS OF RESULTS

Along with the performance of any special experiments or studies, actual protection is also secured, as shown in tables No. 3, 4 and 5. A comparison of the cost of knapsack spraying as against power spraying in Table No. 3 would indicate an advantage in favor of power on a medium concentration of Ribes, because the cost per acre for knapsack spraying on a somewhat lighter concentration of Ribes is practically the same as the cost for power spraying. This cannot be taken as a basis of comparison because the power work was performed on the main drainages which were readily accessible from the camp, while the knapsack spraying was done on the scattered areas on the side drainages which were in most cases at considerable distances from the camp. Consequently the time involved getting into these areas with men, equipment and chemical has a great effect upon the cost. These areas were too scattered and too small to warrant the establishment of side camps to work them out. Also the number of working days on knapsack spraying was not sufficient to absorb a proper proportion of the equipment costs chargeable against the season's operation.

A direct and fair comparison of knapsack and power spraying was made in a special study in which such factors as mentioned above were eliminated. The Moson unit is best adapted to drainages in which Ribes concentrations are uniformly heavy only in case of almost total Ribes infestation.

SPECIAL EXPERIMENTS AND STUDIES

A. Power Spraying was made on the main drainages where Ribes infestation was not uniform, but was a heavy infestation of the Ribes.

1. Equipment. Further tests were made with the motors.

The Ross blister-rust-control units No. 11 and 12, which consist of a 1-cylinder, 2-cycle Cushman motor and a Ross 2-stage rotary pump, were used extensively for the first time since the old air-cooling systems had been discarded and new water jacket cylinders cast and installed on the units. These units were the lightest used and were the most satisfactory. They were the most dependable and gave the most uniform service. The small amount of gas required to operate them is also an advantage. They had sufficient power to handle the maximum requirements of a full crew.

The performance of the Ross No. 10 Type L-1, a 2-cylinder, 2-cycle motor with a small rotary pump and the performance of the Pacific Marine No. 1708 Type H Fire Fighter, a 4-cylinder, 2-cycle motor with a semi-centrifugal pump were satisfactory. However, these units have more power than is necessary for the type of spraying which is done. Working under a reduced load, their performance is not as steady and uniform as in the case of the smaller units. Their consumption of gasoline is considerably greater than that of the Ross units No. 11 and 12. The larger units will

[illegible]

and private power has been a constant factor in the development of the power industry in the United States. The Federal Government has been a major force in the development of the power industry, and the Federal Government has been a major force in the development of the power industry.

Journal of Management Studies, 19(6), 701-718.

Journal of Interpersonal Violence

Further tests were made with the motor.

The above information was obtained from a confidential source who has been reliable in the past.

[illegible]

be used to greater advantage when a dilute solution is developed making it necessary to apply a great amount of solution on an area.

2. Methods

Size of power spraying unit.

The same equipment, set-up and method of spraying was used as in 1929. However, a smaller unit was given a trial. The larger 10-man spraying unit used in 1929 is adaptable to extensive areas with heavy ribes concentrations. This unit is too large to put on any area or drainage having less than 100 or 200 acres of stream type. A 5-man power spraying unit can be placed on these smaller areas without necessitating costly and frequent moves of the equipment. The 5-man outfit proved satisfactory. It has certain advantages over the 10-man unit, the principal one being that the men can be given more supervision. The fact that the unit is smaller and less equipment is required makes it more mobile. It can be easily carried over small areas where ribes are absent.

The scope of the two units is wide:

The 10-man unit is best adapted to drainages in which ribes concentrations are uniformly heavy over an area of stream type of five miles or more in length and of 200 feet or more in width.

The 5-man unit is best adapted to drainages where ribes conditions are not uniform but where there are areas of 50 to 200 acres with heavy ribes conditions scattered along the drainage.

B. Time Analysis Study

The stop-watch method was used for securing the data. Each component part making up the complete spraying operation in both power and knapsack work was accurately timed. The study was made on 20 man-days of power spraying and on 18 man-days of knapsack spraying.

Factors from actual eradication work.

Personal - Personal factors, such as rest.

Waiting for power - Delay caused by break-down or failure of the motor.

Unproductive - Any interruption from personal, animal, or other or interruption in work.

Checking - Looking over area to determine position and extent of bushes that have been missed.

Hand pulling - Pulling bushes by hand where this method is more advantageous than spraying.

It must be pointed out that a single unit is not
sufficiently large to permit of being used in any way.

3. Methods

The first method is to use a single unit as a
basis for the entire system. This method is
simple and easy to understand. The second method
is to use a single unit as a basis for the entire
system. This method is more complicated and
requires a more detailed knowledge of the system.
The third method is to use a single unit as a
basis for the entire system. This method is the
most complicated and requires a very detailed
knowledge of the system. The fourth method is to
use a single unit as a basis for the entire
system. This method is the simplest and easiest
to understand. The fifth method is to use a
single unit as a basis for the entire system.
This method is the most complicated and requires
a very detailed knowledge of the system.

The scope of the two units is:

The first unit is the unit which is used to
control the entire system. The second unit is
the unit which is used to control the individual
components of the system. The third unit is the
unit which is used to control the individual
components of the system. The fourth unit is the
unit which is used to control the individual
components of the system. The fifth unit is the
unit which is used to control the individual
components of the system.

4. The results

The results of the first method are that the
system is simple and easy to understand. The
results of the second method are that the system
is more complicated and requires a more detailed
knowledge of the system. The results of the third
method are that the system is the most complicated
and requires a very detailed knowledge of the
system. The results of the fourth method are that
the system is the simplest and easiest to
understand. The results of the fifth method are
that the system is the most complicated and
requires a very detailed knowledge of the system.

TABLE NO. 6

TIME ANALYSIS OF THE WORK OF A MAN ENGAGED IN POWER SPRAYING

Operation	Minutes	Per Cent
All work timed	8,442	100.0
Spraying	2,529	30.0
Searching	2,904	34.4
Laying string line	772	9.1
Handling lateral hose	393	4.6
Handling main-line hose	168	2.0
Moving to new section	719	8.5
Equipment	305	3.6
Personal	244	2.9
Waiting for power	64	.8
Supervision	30	.4
Checking	30	.4
Hand pulling	14	.2
Other	73	.9

1. 6.9 minutes per acre.

12.52 gallons per acre.

2. 740 minutes per acre.

3. Definition of terms:

Spraying - Actual time nozzle is discharging spray.

Searching - Finding the bushes to be sprayed.

Laying string line - Marking strip boundaries with string.

Handling lateral hose line - Moving, untangling, coiling, or any handling of the $\frac{1}{2}$ " hose on a block.

Handling main line - Any handling of the $\frac{1}{2}$ " hose. This is not a regular duty of the sprayer.

Moving to new section - After the completion of a block, moving to another. A sprayer may work from one to three blocks in a day. A move may be from 500 feet to 1,500 feet.

Equipment - Any repairing or adjusting of equipment which detracts from actual eradication work.

Personal - Personal factors, such as rests.

Waiting for power - Delay caused by break-down or failure of the motor.

Supervision - Any instructions from foreman which caused delay or interruption in work.

Checking - Looking over area to determine whether any strips or bushes had been missed.

Hand pulling - Pulling bushes by hand where this could be done more advantageously than spraying them.

TABLE 2

THE RESULTS OF THE TESTS OF THE DISCHARGE OF THE

Discharge	Time	Pressure
0.1 - 0.2	1.0	1.0
0.2 - 0.3	1.5	1.5
0.3 - 0.4	2.0	2.0
0.4 - 0.5	2.5	2.5
0.5 - 0.6	3.0	3.0
0.6 - 0.7	3.5	3.5
0.7 - 0.8	4.0	4.0
0.8 - 0.9	4.5	4.5
0.9 - 1.0	5.0	5.0
1.0 - 1.1	5.5	5.5
1.1 - 1.2	6.0	6.0
1.2 - 1.3	6.5	6.5
1.3 - 1.4	7.0	7.0
1.4 - 1.5	7.5	7.5
1.5 - 1.6	8.0	8.0
1.6 - 1.7	8.5	8.5
1.7 - 1.8	9.0	9.0
1.8 - 1.9	9.5	9.5
1.9 - 2.0	10.0	10.0

1. All data are given.
2. The discharge is given.
3. The pressure is given.

Spraying - Actual time nozzle is discharging spray.

Discharge - Discharge rate.

Pressure - Pressure at nozzle.

Discharge rate - Discharge rate at nozzle.

Pressure at nozzle - Pressure at nozzle.

Discharge rate at nozzle - Discharge rate at nozzle.

Pressure at nozzle - Pressure at nozzle.

Discharge rate at nozzle - Discharge rate at nozzle.

Pressure at nozzle - Pressure at nozzle.

Discharge rate at nozzle - Discharge rate at nozzle.

Pressure at nozzle - Pressure at nozzle.

Discharge rate at nozzle - Discharge rate at nozzle.

Pressure at nozzle - Pressure at nozzle.

the water.

Discharge rate - Discharge rate at nozzle.

Pressure at nozzle - Pressure at nozzle.

Discharge rate at nozzle - Discharge rate at nozzle.

Pressure at nozzle - Pressure at nozzle.

Discharge rate at nozzle - Discharge rate at nozzle.

Pressure at nozzle - Pressure at nozzle.

TABLE NO. 7

TIME ANALYSIS OF THE WORK OF A MAN ENGAGED IN HAND SACK SPRAYING

Operation	Minutes	Per Cent
All work timed	6,828	100.0
Spraying	2,502	36.3
Searching	2,496	36.3
Filling tanks	823	12.4
Mixing chemical	140	2.0
Equipment	129	1.9
Packing chemical	192	2.8
Personal	286	4.2
Supervision	47	0.7
Checking	12	0.2
Hand pulling	171	2.5
Other	60	0.8

1. 84 gallons per acre.

2. 680 minutes per acre.

3. Definition of terms:

1. 84 gallons per acre on power area.

Spraying - Same as for power.

Searching - Same as for power.

Filling tanks - All activity involved from the time a spray tank is emptied until the worker has returned to his strip with a full tank of spray and resumed spraying operations.

Mixing chemical - Preparing liquid solution for spray. This is not a regular duty of the sprayer.

Equipment - Same as for power.

Packing chemical - Carrying chemical from a cache to a filling station. Any packing of chemical done while walking to work which did not detract from the time actually spent in eradication is not included in this classification.

Personal - Same as power.

Supervision - Same as power.

Checking - Same as power.

Hand pulling - Same as power.

Note: There is no item "packing chemical" under power spraying on account of the fact that the few stations required in this method makes it possible to unload the drums of chemical directly from the pack mules to the stations.

Source of data - Experiments conducted at Seville, Texas, 1935; 1936; 1937; 1938; 1939; 1940; 1941; 1942; 1943; 1944; 1945; 1946; 1947; 1948; 1949; 1950; 1951; 1952; 1953; 1954; 1955; 1956; 1957; 1958; 1959; 1960; 1961; 1962; 1963; 1964; 1965; 1966; 1967; 1968; 1969; 1970; 1971; 1972; 1973; 1974; 1975; 1976; 1977; 1978; 1979; 1980; 1981; 1982; 1983; 1984; 1985; 1986; 1987; 1988; 1989; 1990; 1991; 1992; 1993; 1994; 1995; 1996; 1997; 1998; 1999; 2000; 2001; 2002; 2003; 2004; 2005; 2006; 2007; 2008; 2009; 2010; 2011; 2012; 2013; 2014; 2015; 2016; 2017; 2018; 2019; 2020; 2021; 2022; 2023; 2024; 2025; 2026; 2027; 2028; 2029; 2030; 2031; 2032; 2033; 2034; 2035; 2036; 2037; 2038; 2039; 2040; 2041; 2042; 2043; 2044; 2045; 2046; 2047; 2048; 2049; 2050; 2051; 2052; 2053; 2054; 2055; 2056; 2057; 2058; 2059; 2060; 2061; 2062; 2063; 2064; 2065; 2066; 2067; 2068; 2069; 2070; 2071; 2072; 2073; 2074; 2075; 2076; 2077; 2078; 2079; 2080; 2081; 2082; 2083; 2084; 2085; 2086; 2087; 2088; 2089; 2090; 2091; 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- Definition of terms:
650 minutes per note.
24 sessions per note.

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1968-1969

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE

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It is not a fault of the country.

1. 1940-1941

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1. The first part of the document is a list of names and addresses, which appears to be a directory or a list of contacts. The names are written in a cursive script, and the addresses are listed below them. The list includes names such as "John A. Smith", "Mary E. Jones", and "Robert L. Brown".

... collected? [unclear]

● 11月10日、11月11日、11月12日、11月13日、11月14日、11月15日、11月16日、11月17日、11月18日、11月19日、11月20日、11月21日、11月22日、11月23日、11月24日、11月25日、11月26日、11月27日、11月28日、11月29日、11月30日

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ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED

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1950-1951

1961-1962 30. 01

TABLE NO. 8

COMPARISON OF THE TIME ANALYSES OF POWER AND KNAPSACK SPRAYING ON
A PER ACRE BASIS

Operation	Power		Knapsack	
	Minutes	Per Cent	Minutes	Per Cent
Set time	289	100.00	307	100.00
Spraying	208	31.13	230	38.53
Searching	235	35.74	221	36.24
Laying string line	64	9.30	-	-
Handling lateral hose	49	7.30	-	-
Handling main-line hose	14	2.03	-	-
Filling tanks	-	-	52	18.05
Mixing chemical	-	-	13	2.14
Reckin chemical	-	-	18	2.94
Equipment	23	4.91	12	1.98
Moving to new section	34	8.85	-	-
Other	4	0.54	20	3.32

1. 52 gallons per acre on power area.
54 gallons per acre on knapsack area.
2. All activities not a part of the spraying work and not dependent upon the method of spraying have been eliminated from this table.

TABLE NO. 9

COMPARISON OF THE PRODUCTIVE EFFICIENCY OF POWER AND KNAPSACK SPRAYING
ON AREAS OF VARYING WEED DENSITY
(See Chart No. 1.)

Gallons Per Acre	Power		Knapsack	
	Minutes	Per Acre	Minutes	Per Acre
11	330		200	
13	418		340	
35	-		420	
52	683		-	
54	-		607	
78	730		780	
200	930*		1,377*	

Source of data - Experiments conducted at Bovill, Idaho, 1928; Morro Bay, California, 1929; Clearwater National Forest, 1929-1930.

*These figures were computed using the data secured in the time analysis study as a basis.

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE
DATE 11-14-2013 BY 60322

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10/4	10:00	10:00	10:00	10:00	10:00
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1. All information not a part of the original report shall be deleted from this report.

10. *Journal of the American Medical Association*, 1990; 263: 1033-1037.

FOR THE DIRECTOR OF THE BUREAU OF THE CENSUS

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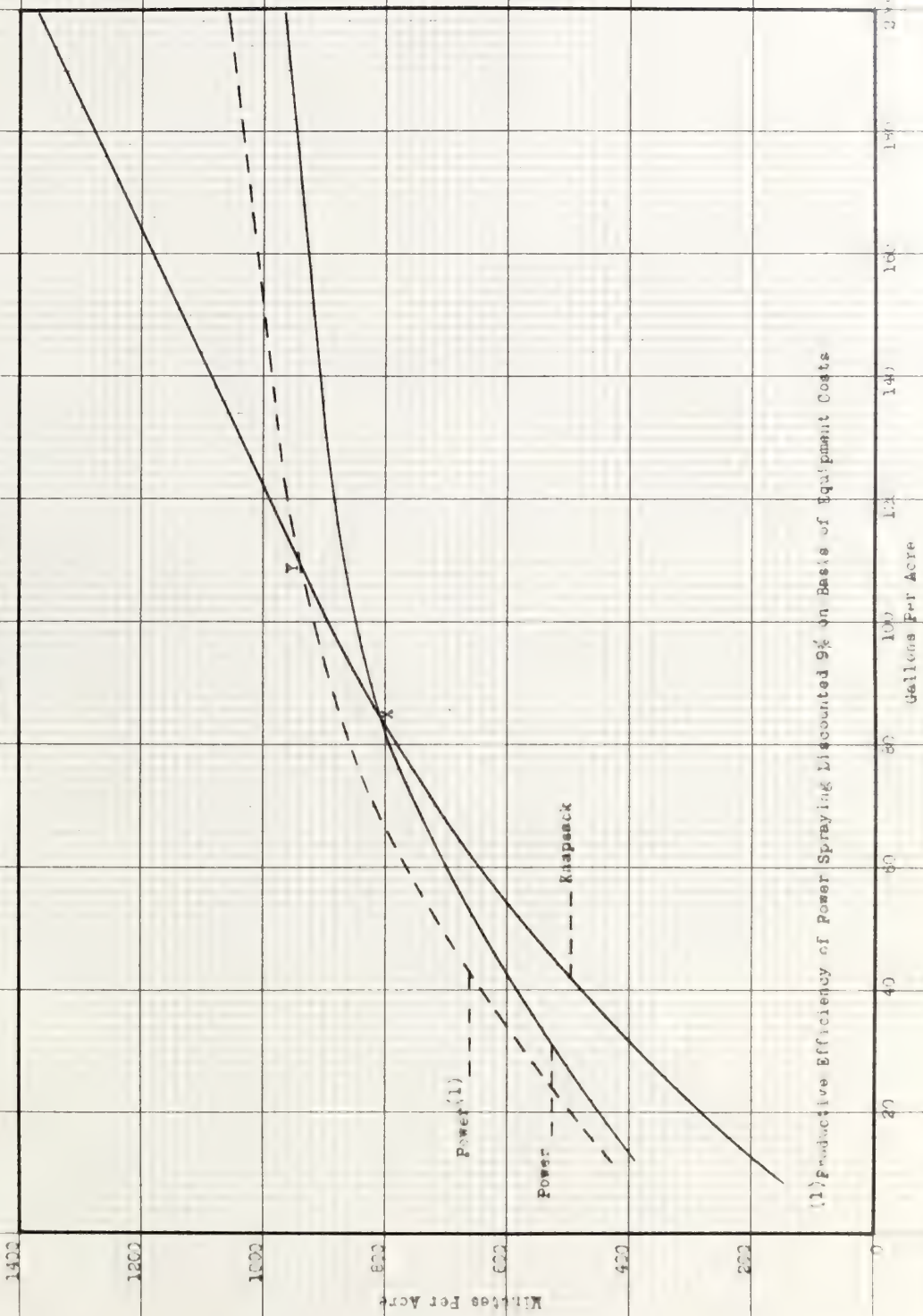
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| 2029 | 100 | 100 |
| 2030 | 100 | 100 |

Source of data - experiment conducted at McGill, Quebec, 1961-1962. Data collected from 1961-1962, and 1963-1964.

1. The first group of people who are interested in the study of the history of the United States are the people who are interested in the history of the United States.

CHART NO. 1

COMPARISON OF THE PRODUCTIVE EFFICIENCY OF POWER AND KNAPSACK
 SPRAYING ON AREAS OF VARYING RIGHS DENSITY
 (Data in Table No. 9)



(1) Productive Efficiency of Power Spraying Discounted 9% on Basis of Equipment Costs

DISCUSSION AND ANALYSIS OF EXPERIMENTAL RESULTS

The results of the time analysis study show that 67 per cent of the time of a man engaged in power spraying on an area with a hives density of approximately 20 per cent is spent in searching for and spraying hives. The other 33 per cent of the worker's time is used in handling equipment or marking the area with string lines for satisfactory working. This 33 per cent is made up of six different operations or activities, none of which alone involves a great amount of time.

In power spraying, the entire set-up of hose lines and equipment must be lined out on an area whether twenty gallons or two hundred gallons per acre are required to spray the hives. Consequently the time involved in laying out the equipment is constant, regardless of the hives concentration. The heavier the hives concentration, the higher becomes the actual spraying or productive time and the proportion of time spent on supplementary operations becomes less. Herein lies the value of power spraying methods, the application of a large volume of spray on a small area.

In knapsack spraying, the same study shows that 77 per cent of the worker's time on an area with a hives density of approximately 20 per cent is spent in searching for and spraying hives. The other 23 per cent of the operator's time is spent on five different operations or activities, the largest of which is the filling time. In the case of knapsack spraying, the time involved in these supplementary activities is not constant on areas having varying hives concentrations. This time varies in proportion to the total time required to work an area. In order to apply a larger number of gallons of spray to an area, it is necessary to pack and mix additional chemical and also to fill the spray tanks in direct proportion to the greater number of gallons required. Consequently, the productive time of knapsack spraying methods remains fairly constant as expressed in a percentage of the total time required to cover an area.

All experiments conducted to show the relative merits of power and knapsack spraying have shown knapsack methods to be the more satisfactory. In Chart No. 1, the results of these various experiments, including the data secured on the time analysis studies conducted in 1933, have been used in the construction of a curve to show the scope of the two methods. In this chart, the figure of 200 gallons per acre represents the amount of chemical necessary to spray an area with 100 per cent ground cover of hives. This measure was secured by a study in which an area was carefully selected for a 100 per cent ground cover of brush, which brush was for the most part hives, the other bushes on the area being quite comparable to hives as to size and leaf surface. Careful spraying of all this brush required 200 gallons.

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1. The first of these is the fact that the majority of the population of the country is of Indian descent. This is due to the fact that the country was discovered by a Portuguese explorer in 1498, and the Portuguese were the first to settle there. The Portuguese were followed by the Dutch, the British, and the French, but the Indian population remained the majority.

of all this brush required 200 gallons.

In constructing the curves for power and knapsack spraying, actual data were available for areas requiring from 11 gallons to 78 gallons per acre. However, since it is known that 200 gallons per acre represents the number of gallons required on a 100 per cent Ribes concentration, it was possible to compute from the data secured in the time analysis study, the amount of time required to spray such a concentration. At the present time, the curves

Point X, representing 82 gallons per acre, determines the concentration of Ribes on which the actual time required by the operator to cover the ground is exactly the same in either knapsack or power spraying. On areas requiring less than 82 gallons per acre, a man equipped with a knapsack sprayer can cover the ground faster than a man engaged in power spraying. When more than 82 gallons per acre are required, the ground can be covered faster by power spraying.

When the kind of sprayer used. The chart

In power spraying, the cost of equipment required for a crew of 10 sprayers is considerably more than that required for a like number of knapsack sprayers. On this basis, it costs 9 per cent more to maintain a man for each working day on power spraying than it does to maintain a man on knapsack spraying. The dotted line curve on the chart designated as "power¹" takes this fact into consideration and discounts the speed of power spraying by 9 per cent. Therefore, point Y at 109 gallons per acre represents the point at which the scope of knapsack spraying ends and that of power spraying begins.

of the Ribes by either broadcast or spot method. At present methods

As there are very few areas on which more than 80 or 80 gallons per acre are required to spray the Ribes, knapsack spraying methods should be used on all practical operations.

In order to reduce the cost of power spraying

In the construction of the curves on the productive efficiency of spraying methods, it was presumed that a single No. 111 fine nozzle is used as standard equipment. On the heavier concentrations, where 100 gallons or more are required per acre, it would be possible to use a double nozzle to great advantage which would reduce the time required to spray the bushes. If a double nozzle was used on the heavier concentrations, the upward trend of the curves would be less. However, the effect upon the two curves would be approximately proportional, as the advantage of the double nozzle would accrue to both power and knapsack spraying.

This analysis of the two methods of spraying will hold as long as the present type of chemical is used. On account of the approximate cost of 12 cents per gallon for the chemical, dependent somewhat upon the amount of transportation necessary to place the chemical on the job, it is necessary to be as conservative as possible in its use. When a cheaper chemical is developed which is effective on Ribes, permitting the use of a greater volume of spray applied in a more broadcast manner,

power spraying will have a definite advantage.

line will involve a
as the spraying out of PLANTS FOR FUTURE WORK

A. Chemical Eradication

At the present time, the chemicals which are adaptable to field use have been effective on R. petiolare only. Heavy concentrations of R. inornate and R. lacustre in stream type represent an almost insurmountable problem to hand pulling methods. In view of the development of chemicals requiring different methods of application which will be effective on all Ribes species, it is necessary to devise suitable equipment and crew methods for performing this work.

The experiments divide themselves into three divisions based upon the kind of chemical used. The ultimate purpose of these experiments is to determine the most effective and economical means of destroying all species of Ribes in stream type. This involves the testing of the various chemicals by different methods or combination of methods of application.

1. Use of Atlacide in 10 per cent solution. (This division also includes the use of a solution of sodium chlorate in various concentrations.)

a. Successive applications of this spray to the aerial portion of the Ribes by using present equipment and crew methods, to determine the number of applications required to kill R. inornate and R. lacustre.

b. Spraying the aerial portion of the bush and also the adjacent ground in order to reach the roots. Present equipment and crew methods will be used.

2. Soil application treatment.

a. A broadcast spraying operation using a large volume of a cheap salt or other solution by which the soil is sufficiently saturated that the roots of the Ribes bushes will take in the chemical. This method would be performed with power equipment.

b. A localized application of a concentrated solution to the soil surrounding the roots of the bushes. This operation may require either knapsack or power spraying equipment.

3. Stem injection.

a. This requires the injection of a paste substance into the stem of the Ribes. Special tools must be designed for making the injections. Is the development of this chemical and any knowledge of the number and location of injections required on the Ribes bushes for

best results will be a reliable indicator.

PLANS FOR FUTURE WORK

Chemical Medication

In the present study, the chemical agents were administered in a form which was effective on the animals only. It is to be expected that the use of chemical agents in a form which is effective on the animals only, is not sufficient to bring about the desired results. It is to be expected that the use of chemical agents in a form which is effective on the animals only, is not sufficient to bring about the desired results. It is to be expected that the use of chemical agents in a form which is effective on the animals only, is not sufficient to bring about the desired results.

The experiments of the present study have shown that the use of chemical agents in a form which is effective on the animals only, is not sufficient to bring about the desired results. It is to be expected that the use of chemical agents in a form which is effective on the animals only, is not sufficient to bring about the desired results. It is to be expected that the use of chemical agents in a form which is effective on the animals only, is not sufficient to bring about the desired results.

Use of the results of the present study to determine the effect of chemical agents in a form which is effective on the animals only, is not sufficient to bring about the desired results. It is to be expected that the use of chemical agents in a form which is effective on the animals only, is not sufficient to bring about the desired results. It is to be expected that the use of chemical agents in a form which is effective on the animals only, is not sufficient to bring about the desired results.

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A chemical agent in a form which is effective on the animals only, is not sufficient to bring about the desired results. It is to be expected that the use of chemical agents in a form which is effective on the animals only, is not sufficient to bring about the desired results. It is to be expected that the use of chemical agents in a form which is effective on the animals only, is not sufficient to bring about the desired results.

A localized application of a chemical agent in a form which is effective on the animals only, is not sufficient to bring about the desired results. It is to be expected that the use of chemical agents in a form which is effective on the animals only, is not sufficient to bring about the desired results. It is to be expected that the use of chemical agents in a form which is effective on the animals only, is not sufficient to bring about the desired results.

3. Stem Injection

The results of the present study have shown that the use of chemical agents in a form which is effective on the animals only, is not sufficient to bring about the desired results. It is to be expected that the use of chemical agents in a form which is effective on the animals only, is not sufficient to bring about the desired results. It is to be expected that the use of chemical agents in a form which is effective on the animals only, is not sufficient to bring about the desired results.

killing is in an elemental stage, the experiments conducted along this line will involve a careful and thorough study of these factors as well as the working out of a practical method of application.

4. Reworking areas after original spraying operation. In the absence of any information showing that any of the above chemicals will completely kill the Ribes (especially *R. inerme*) after the first application, studies are to be made on areas where *R. inerme* had been sprayed with a 10 per cent solution of Atlatine in 1930. In 1931, hand pulling, soil application, and a combination of hand pulling and soil application methods are to be used on this area in order to determine the most economical method of eradicating *R. inerme*.

5. Hand pulling. In order to secure comparative cost and efficiency data on these areas, a certain amount of hand pulling work is to be done both on the areas which are being worked for the first time and on the areas that are being reworked the second year.

B. Hand Eradication

1. Relation of costs to efficiency. The experiments will be designed to show the cost of work necessary to secure various degrees of efficiency measured in the number of feet of live stem left on the area.

2. Methods of working to reduce the amount of live stem left on an area. All data show that a 3-man or 4-man crew with no one checking directly behind the crew is the most satisfactory method. To insure efficient work and to reduce the amount of live stem left on an area to a protective standard, it is necessary to rework the area. In these experiments, selected men will be assigned to rework all the strips covered by the regular eradication crews on areas where Ribes were present. The variations in the method of reworking, which are to be given a trial, will consist in the number of men making up the crew which does the reworking. The number of men used will vary from one man to the number of men in the regular eradication crew which worked the strips originally.

Some data secured in previous experiments are already available which indicate the practicability of the method. The method of reworking by one man is far more efficient and more economical than the old method of a foreman checking directly behind the line.

3. Uphill-downhill as compared to uphill-contour work. No conclusive data have been secured showing the most satisfactory method of working slopes which are extensive enough to permit uphill and downhill work or uphill and contour work. The present method in general use is to work uphill to the ridge top and then work in the direction of the contour. However, evidence secured in a small experiment conducted in

as the working out of a program of action in the future.

1. Newerling (1967) after all the spraying operation. In the absence of any other data, the first application, studies have been sprayed with a 10 per cent solution of the oil application methods are the most economical method

2. Work quality. In order to have a comparative cost and efficiency test on future trials, a definite amount of hand grading work is to be done each year on the same amount of land for the first time and on the same land for the second year.

collected from the same

1. Reliability of work efficiency. The experiment will be designed to determine the effect of various degrees of efficiency on the work.

[illegible]

James Earl Ray was born in Jackson, Mississippi, on May 19, 1928. He was the son of a poor farmer and a school teacher. He was educated in the public schools of Jackson and graduated from the University of Mississippi in 1950. He then served in the United States Army from 1950 to 1952. After his discharge, he worked as a janitor and a security guard. He was arrested in London in 1967 on charges of kidnapping and was later convicted of the murder of Dr. Martin Luther King Jr. in 1969. He was sentenced to 99 years in prison. He was paroled in 1991 and moved to the United States. He was arrested again in 1997 and sentenced to life in prison for the murder of a federal judge. He died in prison on April 23, 2011.

... was secured in a small experiment conducted in ... work in the direction of the ... method in general was in to ... enough to permit Whill and Howell work ... have been ... gared to Whill-contour work. No conclusive

1928, shows a decided advantage in favor of downhill work as against contour work. Data on this point can be secured on large areas by working blocks of 500 to 1,000 acres by the two methods. This can be done in conjunction with the regular eradication work.

John E. Bennett
Agent

TABLE

For information of the Bureau and the States, the following is a list of the equipment used in the eradication of weeds, with the development of the equipment, in the Bureau of Plant Industry study and experimentation.

From 1925 to 1928 and 1929 to 1930

1. Brown pump.

The Brown pump, a detailed description of which was given in the 1925 blister rust report, is a double-acting tremble sprayer, capable of pumping 100 pounds of liquid per hour. It is designated as No. 1 Type A in the accompanying drawing. It is fitted with a control lever for all extensive chemical spraying in the Northwest. It is necessary to have the pump fitted with the pump ring 2-fig-8 and the packing stop ring 2-fig-9. The Brown pump has since been improved and is now being furnished to all field camps.

2. Trigger nozzles. The brass automatic trigger nozzle valves on power spraying units were replaced with a needle valve having a steel tip and a brass seat. The all-brass needle valves broke at a point where the needle was attached to the pump.

3. Trigger nozzle valves. The trigger nozzle valves were replaced with a needle valve having a steel tip and a brass seat. The all-brass needle valves broke at a point where the needle was attached to the pump. These are similar to the pins designed in 1925. The trigger nozzle valves are now being supplied to all field camps. A trigger nozzle valve was supplied on each automatic nozzle to adjust the flow of spray from the trigger nozzle.

4. No. 1 for sprayer spray tanks. In 1925 a 1/2" light weight spray tank of 100 gallon capacity was used on spray tanks. It was of

PUMP - NUMBER 1 - TYPE A

CHEMICAL ERADICATION METHODS

B - PIA

SUPPLEMENTAL REPORT

ON

EXPERIMENTAL AND FIELD EQUIPMENT, 1930

By

John F. Breakey

Agent

PURPOSE

The improvement of present equipment for the chemical eradication of Ribes, and the development of new apparatus, is the purpose of equipment study and experimentation.

WORK PERFORMED AND RESULTS ACCOMPLISHED

A. Improvement of Equipment Now in Use.

1. Brown pump. The Brown pump, a detailed description of which was given in the 1929 blister rust report, is a double-acting trembone cylindrical brass pump, capable of pumping 250 pounds maximum pressure and delivering 3 cubic inches of liquid for each 2 cycles of the plunger. This pump is designated as No. 1 Type A in the accompanying photograph. It is relied upon for all extensive chemical spraying in blister rust control operations in the Northwest. It became necessary to replace the plunger stop ring B-PIA-6 and the packing stop ring B-PIA-10 with heavier, more durable rings. The Brown Company has since agreed to make these changes. A complete set of repair parts as shown in the photograph was furnished to all field camps.

B - PIA - 4

2. Trigger nozzles. The brass automatic trigger nozzle needle valves on power spraying units were replaced with a needle valve having a mild steel tip and a brass seat. The all-brass needle valves broke at a point where the handle was fastened to them.

3. Ball check valve releases. Pins for releasing the ball check valves attached to the ends of the laterals on the power spraying lines were devised. These are similar to the pins designed in 1929 with the exception that they are removable and interchangeable. A set screw was supplied on each automatic nozzle to adjust the flow of spray when engaged in the trigger nozzle.

B - PIA - 10

4. Hook for knapsack spray tanks. In 1929 a 1/2" light weight wrapped rope, 30 inches in length was used on spray tanks. Considerable

Annual Report 1930

J. F. Breakey

PUMP - NUMBER 1 - TYPE A



B - PIA



B - PIA -



B - PIA - 2



B - PIA - 3



B - PIA - 4



B - PIA - 5



B - PIA - 6



B - PIA - 8



B - PIA - 7



B - PIA - 9



B - PIA - 11



B - PIA - 10

| |
|---------------------------------|
| PUMP - FIELD EQUIPMENT - TRUCK |
| OFFICE - FIELD EQUIPMENT |
| U. S. DEPARTMENT OF AGRICULTURE |
| 12 - 4 - 30 |
| BY <i>ja</i> |

difficulty was experienced by operators caused by the hose pinching as it swung through a 45-degree arc when the pump was in operation. A heavy pressure hose was supplied in 1930. The tank hose fittings were fastened to an elbow attached to the tanks. This heavy hose was unsatisfactory. It placed so much strain on the small hose fitting on the 27-gal sheet iron tank that a break in the tank usually occurred. This was caused in part by the elbow. At the close of the field season the elbows were removed and the heavy hose was discarded.

5. The pack frames were made more satisfactory for carrying tanks by the attachment of metal supports and by the use of eye bolts in place of screw eyes.

6. All field equipment was overhauled and put in first-class shape at the end of the field season.

3. The Development of New Equipment.

1. Duster. A knapsack type of machine was constructed to scatter chemical in the form of a dust. Hydraulic force secured by the operation of a plunger in a small tube in the hands of the carrier is applied to the two larger cylinders on the sides of the duster, causing the bellows to close and at the same time working a dust agitator and a force feed enclosed in the hopper of the machine. Springs return the bellows to its normal position. Wheels and ratchets operate the worm and screw mechanism which comprises the agitator and feed mechanism.

The dusting experiments conducted show that the dust in its present state (Attacide) is not satisfactory. Large quantities are needed to do an effective job because of waste, and it is not possible to dust continually during the entire day on account of humidity changes.

The hygroscopic agent in the dust ceases to absorb enough moisture from the air during the heat of the day to cause the dust to stick to the ribs.

2. Federal pump No. 3, Type A. This pump is a double-acting trombone variety cylindrical brass pump capable of pumping a maximum pressure of 450 pounds and with an average working pressure, under normal conditions, of 100 pounds and capable of delivering 4 cubic inches of liquid for each 2 cycles of the plunger. This small high pressure pump was made to shorten the actual time consumed in spraying and also to reduce the weight of the spraying equipment.

5-P3A-11

PUMP - NUMBER 3 - TYPE A



F-P3A



F-P3A-1



F-P3A-2



F-P3A-3



F-P3A-5



F-P3A-4



F-P3A-6



F-P3A-8



F-P3A-7



- P3A-9



F-P3A-10



F-P3A-11

U. S. DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ARTILLERY
WASHINGTON, D. C.
JULY 1930
J. F. Breakey

Annual Report 1930
J. F. Breakey

Preliminary tests were made comparing the efficiency of Federal pump No. 3, Type A with Brown pump No. 1, Type A. The ease in operating the No. 3 pump may give it some advantage over pump No. 1. Any definite statement as to the comparative efficiency of the two units must await the manufacture of the No. 3 pump from materials which will permit extensive tests in the field.

3. Duraluminum pack frames. Pack frames, having the same design and outside dimensions as the regular Trapper Nelson frame, were constructed from duraluminum tubing with walls 1/32" in thickness. This material in contrast to the old wooden frames is not affected by moisture. The duraluminum frames hold their shape and do not deteriorate as fast as the wooden frames. The wooden frames are also subject to much breakage.

4. Four-gallon knapsack tank. This experiment was devised to test three different types of sheet metal for tank construction, and to determine whether or not a small tank unit would be adequate for field spraying operations.

The metals used were 24 tin plate, 24 tin plate copper coated, and 27-gage galvanized iron. The galvanized iron was most satisfactory.

The five-gallon tank proved to be more satisfactory than the four-gallon tank on account of the frequency at which the larger volume was taken. The slight extra weight in the larger tank is not sufficient to be a handicap to the carrier.

5. Chemical application tools for treating roots and crowns of Ribes. Root and crown chemical treatment involves the finding of the crowns of the Ribes often among dense grass and brush, and the application of a highly toxic chemical to the crowns and roots of Ribes. The best results are obtained where the roots and crowns are scarified at the same time the chemical is applied.

Stakes, 14, 18, 24 and 30 inches in length, painted red with white stripes were used to mark the location of the crowns before applying the chemical solution. Then a man equipped with a knapsack unit, having an automatic trigger nozzle with a long curved spout attached (see photograph) applied the chemical to the crowns.

It was later decided to eliminate the marking of the crowns by the use of stakes. In place of this method a tool (see photograph) was devised which has a rough pronged end for uncovering the crowns and a trigger nozzle and connecting pipe for applying the chemical to the plants.

will permit extensive tests in the field.

3. Permethrin back sprays. Back sprays, having the same active ingredient as the regular trigger sprayer, were constructed from permethrin (0.1% in kerosene). This material in contrast to the old wooden frames is not affected by water. The permethrin frames hold their shape and do not deteriorate as fast as the wooden frames. The wooden frames are also subject to breakage.

4. Five-gallon backpack tanks. This experiment was devised to test three different types of cheap metal for tank construction, and to determine whether or not a small tank will be adequate for field spraying operations.

The metals used were 2X tin plate, 2X tin plate copper coated and 2X-gauge galvanized iron. The galvanized iron was most satisfactory. The five-gallon tank proved to be more satisfactory than the four-gallon tank on account of the increased capacity in the larger volume was better. The alloy tank which in the larger size is not satisfactory to be a handicap to the carrier.

5. Special application tools for treating roots and crowns of plants. Root and crown sprayers are used for treating the roots and crowns of the plants. These sprayers have been used for many years and the results of a highly toxic chemical on the sprayer and roots of plants. The best results are obtained when the roots and crowns are treated at the same time the chemical is applied.

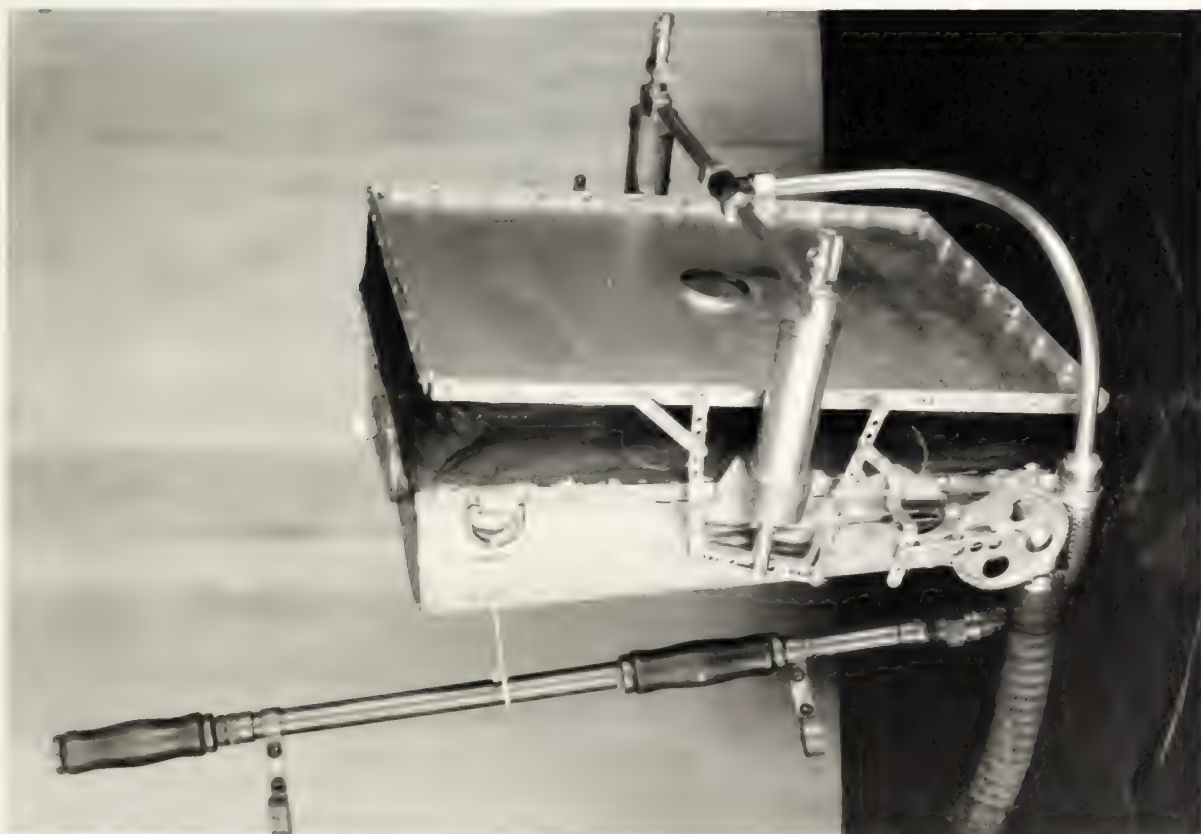
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7. Special application tools for treating roots and crowns of plants. Root and crown sprayers are used for treating the roots and crowns of the plants. These sprayers have been used for many years and the results of a highly toxic chemical on the sprayer and roots of plants. The best results are obtained when the roots and crowns are treated at the same time the chemical is applied.

ROOT CROWN TOOLS



DUSTER



Annual Report 1930
J. F. Breakey

Crown application of chemical sprays for destruction of Ribes is in an experimental stage and checks must be made to determine which method is most effective.

6. Dual purpose spraying equipment readily convertible to fire fighting apparatus.

a. Pump No. 2 - Type B. In fire control a pump is required with a much larger spraying capacity than the pump used in spraying Ribes. A double-acting duraluminum pump 1-5/8" in diameter was constructed to meet this requirement, but it was found to be too large for one man to operate.

The pump, No. 2 - Type B, shown in the accompanying drawing, designed to compound the action of a double-action transverse pump, has four valve openings, a feeder pipe on the side, and two cup plunger washers operating on both the compression and expansion strokes.

Referring to the drawing, it will be seen that the operation of the pump is as follows: Water enters at A from a hose line, and on the expansion stroke of plunger the liquid is drawn into recess D at valve B. Valve C and valve G are closed. On the compression stroke valve B closes and valve C opens, valve G opens and valve H closes, and the water from recess D flows out into recess I and through nozzle orifice J. At the same time recess K extending on into recess F is filled with liquid. On the expansion stroke valve B is open and C is closed, valve G is closed and H is open, and recess D is filled with water. Water from recess F flows out through valve H into recess I and through orifice J. This completes the operation of the pump. The same ball check operates in both valve seats G and H alternately as the plunger moves back and forth. The diameter of the barrel is 5/8" and the length of stroke is 1 1/2". The capacity of this pump is approximately 10 cubic inches.

b. Fire nozzle for hand pumps. A cross section drawing of the nozzle shown attached to pump No. 2 Type B illustrates its four parts: the aluminum base with 1/4" pipe thread for attaching to pump, the orifice with 5/32" opening J, the brass plate K with one side cut away, and brass spring washer L. By revolving plate K which is haurled on the outside, the stream can be made either round or a flat fan shape. The direction of the stream can be changed by simply rotating the plunger of the pump.

This nozzle is designed for fire fighting. A single stream can be procured when it is necessary to throw the water up to a distance

Given application of chemical agents for destruction of life
is in an experimental stage and checks must be made to determine when
method is most effective.

6. Dual purpose engine assembly readily convertible to fire
fighting apparatus.

a. Pump No. 2 - Type B. In fire control a pump is
required with a hand lever control operating from the pump seat to
operate the pump. A double-acting mechanism pump 1-5/8" in diameter
connected to meet this requirement, but it was found to be too large
for one man to operate.

The pump, No. 2 - Type B, shown in the accompanying drawing,
designed to compress the action of a double-acting piston pump, has
four valve openings, a leader pipe on the side, and two air lines
leading operation on both the compression and extension strokes.

Relating to the drawing, it will be seen that the operation
of the pump is as follows: When water at 4 from a hose line, and
the expansion stroke of the pump the liquid is drawn into cylinder C at
valve 1. Valve 2 and valve 3 are closed. At the compression stroke
valve 1 closes and valve 2 opens, valve 3 opens and valve 4 opens, and
the water then passes to cylinder D and into valve 1 and valve 2.
At the extension stroke valve 2 extends and into valve 3 and valve 4
with liquid. At the compression stroke valve 3 is closed and valve 4 is closed
valve 2 is closed and valve 3 is open, and valve 4 is filled with water.
From cylinder D liquid and through valve 3 into valve 1 and through
valve 1. This completes the operation of the pump. The pump will
check operation in both valve 3 and valve 4 and is automatically as the cylinder
moves back and forth. The diameter of the barrel is 3/4" and the length
of stroke is 1 1/2". The capacity of this pump is approximately 12 cubic
inches.

b. Fire control for dual purpose. A dual purpose pump
of the nozzle shown attached to pump No. 2 type B (illustrated in drawing
water; the aluminum base with 1/4" pipe thread for attachment to pump,
the orifice with 5/16" opening. The brass plate with one side and
away, and brass spring valve 1. By revolving plate 1 which is mounted
on the outside, the orifice can be made either round or a flat fan shape.
The direction of the stream can be changed by simply rotating the nozzle
of the pump.

This nozzle is designed for fire fighting. A nozzle stream
can be produced when it is necessary to have the water on a flat

PUMP - NUMBER 2 - TYPE B



PUMP - EXPERIMENTAL - FED. NO. 2
 OFFICE OF BLISTER RUST CONTROL
 U S DEPARTMENT OF AGRICULTURE
 12-19-30
 BY John J. Breakey

of 20 to 30 feet. The course fan spray is more suitable for application of the water to fire in close proximity to the worker.

Total work season.

STATEMENT OF COSTS

For 1922-23 Forest Service.

| | | |
|---------------|---------------|------------|
| Salary..... | \$1,599.96 | |
| Expenses..... | <u>151.04</u> | \$1,751.00 |

Cost of equipment -

Extermination -

| | | |
|-----------------------------|--------------|--------|
| Aluminum pack frame..... | \$36.00 | |
| Aluminum pack frame..... | 36.00 | |
| Duster..... | 411.27 | |
| Special 4-gallon tanks..... | 21.45 | |
| Nozzle testing apparatus... | 7.36 | |
| Special trombone pump..... | 37.38 | |
| Special trombone pump..... | <u>28.85</u> | 574.31 |

Chemical studies -

Root crown tools -

| | | |
|------------------------------|-------------|--------|
| Trigger valve 1/4" outlet... | \$23.60 | |
| Trigger valve 1/2" " | 25.69 | |
| Spade tool and valve 1/2" | | |
| outlet..... | 42.21 | |
| Tank reconstruction..... | 5.50 | |
| Gloves..... | <u>3.00</u> | 100.00 |

*Dual purpose pumps -

| | | |
|--------------------------|--------------|-------|
| Duraluminum tubing..... | 35.35 | |
| Pump No. 2 - Type B..... | 44.50 | |
| Aluminum nozzles..... | <u>15.05</u> | 94.90 |

| | | |
|------------|--|------------|
| Total..... | | \$2,520.21 |
|------------|--|------------|

*Materials furnished by Forest Service.

RECOMMENDATIONS FOR FUTURE EXPERIMENTATION

A. Pumps

1. Federal No. 3 Type A. Continue experiments with various tubing until one is found that is strong enough to stand the field tests, and which will resist the action of chemicals.

2. Dual purpose pump No. 2 Type B. Copy the set-up of this pump but make it smaller to determine whether or not it will speed up spraying operations.

spraying operations.

2. Dual purpose pump No. 2 - Type 2. Cost the same as Type 1 but more efficient in operation and it will spray the

which will resist the action of chemicals.

1. Industrial No. 2 Type 1. Excellent equipment of the highest quality and is found that it is more efficient in operation than Type 2.

A. Forms

RECOMMENDATIONS FOR FURTHER INVESTIGATION

*Materials furnished by Forest Service.

| | | |
|-----------------------|-------|---------------------------|
| 12,500.00 | ..... | Total |
| 10.00 | ..... | ..... |
| 44.50 | ..... | ..... |
| 38.50 | ..... | ..... |
| * Dual purpose pump - | | |
| 3.00 | ..... | Gloves |
| 4.00 | ..... | Gas resistance |
| 42.21 | ..... | outlet |
| 35.39 | ..... | Spade tool and valve 1/2" |
| 35.39 | ..... | Trigger valve 1/2" |
| 35.39 | ..... | ..... |
| 35.39 | ..... | Root crown tools - |
| Chemical studies - | | |
| 35.39 | ..... | Special trombone pump |
| 38.38 | ..... | Special trombone pump |
| 7.15 | ..... | Special 4-gallon tanks |
| 21.45 | ..... | Special 4-gallon tanks |
| 41.75 | ..... | ..... |
| 35.39 | ..... | Aluminum back frame |
| 35.39 | ..... | Aluminum back frame |
| 154.00 | ..... | ..... |
| 151.04 | ..... | Expenses |
| \$1,559.98 | ..... | Salary |
| \$1,781.00 | ..... | ..... |

STATEMENT OF COSTS

of the water in line is also present in the water.

of 10 to 15 feet. The course for spray is now suitable for application

B. Duraluminum Pack Frames

Herman E. Evans

Construct several light metal pack frames for a thorough field trial next season.

C. Nozzles for Power Spraying.

Use Myers nozzles with special needle valve.

D. Suitable Tool for Injecting Chemical Paste into Stems of Ribes Plants.

Devise a tool that will be practical to use for stem injections.

E. Nozzles.

Determine by tests whether or not discs other than 111 fine are needed as standard field equipment, as between the methods operation

F. Factory Equipment.

Use every opportunity to get the factories supplying us with the major part of our equipment to build it exactly as our field requirements necessitate.

Although the loss of time from eradication work prevented the completion of certain work, this situation was well compensated for by the fact that the eradication work was able to give at a time of emergency.

This report deals with the work done by the Forest Service during over the period from July 1 to September 12. A summary of the work done is given in the following table. The results of the Forest Service operation. For a detailed account of the work performed by the various units, refer to the report on field eradication methods.

of Ribes from stream type.

2. Training personnel for future work.

LOCATION AND DISTRIBUTION OF AREA

The Ribes eradication work was conducted in the Ribes area of the Forest Service National Forest. This area, located in

1. The first thing I noticed when I stepped out of the plane was the cold. It was a sharp contrast to the warm, humid air of the tropics. I had heard that the weather in the north was harsh, but I didn't realize it would be so different. The sun was low in the sky, and the ground beneath my feet felt like ice.

2. As I walked through the snow, I noticed that the trees were bare. No leaves, no greenery. Just a stark, white landscape. I had never seen anything like this before. It was beautiful, but also a little scary. I had heard that the winters were long and dark, and now I was experiencing it firsthand.

3. The first night was the longest. I had heard that the nights were long, but I didn't realize it would be so dark. The sun had set, and the moon was a thin, pale line in the sky. I had never seen a night like this before. It was beautiful, but also a little scary. I had heard that the winters were long and dark, and now I was experiencing it firsthand.

4. The first day of school was the most challenging. I had heard that the schools were good, but I didn't realize it would be so different. The teachers were strict, and the students were serious. I had never seen anything like this before. It was beautiful, but also a little scary. I had heard that the winters were long and dark, and now I was experiencing it firsthand.

5. The first winter was the most difficult. I had heard that the winters were long and dark, but I didn't realize it would be so cold. The snow was deep, and the wind was harsh. I had never seen anything like this before. It was beautiful, but also a little scary. I had heard that the winters were long and dark, and now I was experiencing it firsthand.

6. The first spring was the most beautiful. I had heard that the springs were warm and sunny, but I didn't realize it would be so different. The snow had melted, and the flowers were in bloom. I had never seen anything like this before. It was beautiful, but also a little scary. I had heard that the winters were long and dark, and now I was experiencing it firsthand.

7. The first summer was the most relaxing. I had heard that the summers were hot and sunny, but I didn't realize it would be so different. The sun was high in the sky, and the ground was warm. I had never seen anything like this before. It was beautiful, but also a little scary. I had heard that the winters were long and dark, and now I was experiencing it firsthand.

8. The first autumn was the most colorful. I had heard that the autumns were beautiful, but I didn't realize it would be so different. The leaves were in shades of orange, red, and yellow. I had never seen anything like this before. It was beautiful, but also a little scary. I had heard that the winters were long and dark, and now I was experiencing it firsthand.

9. The first year was the most memorable. I had heard that the winters were long and dark, but I didn't realize it would be so different. The snow was deep, and the wind was harsh. I had never seen anything like this before. It was beautiful, but also a little scary. I had heard that the winters were long and dark, and now I was experiencing it firsthand.

Lower Clearwater RIBES ERADICATION ON NATIONAL FORESTS

By

Herman E. Swanson
Agent

North, Ranges 6 and 7 east.

INTRODUCTION

The ground action for the eradication of Ribes by the Forest Service was

Ribes eradication for the control of white pine blister rust was begun by the Forest Service during the 1930 field season. An allotment of \$25,000 was available for the work which began July 1 and continued until September 12. Technical and administrative supervision for the field units was furnished by the Office of Blister Rust Control.

In conjunction with the Forest Service work, the Office of Blister Rust Control maintained an organization throughout the season for the purpose of developing and improving methods of Ribes eradication. The methods unit, along with its special studies, was engaged in practical control work. The principal distinction between the methods operation and that of the Forest Service was the use of power spraying equipment in the methods camp and knapsack sprayers in the Forest Service camps.

Reference should be made to the service rendered by the Ribes eradication personnel during the fire season. During the month of August, the personnel of two of the 20-man camps were called out on fire duty for a period of five days. In September, ten men were taken over to the Selway Forest for three days. Although the loss of time from eradication work prevented the completion of certain areas, this situation was more than compensated for by the help which the eradication forces were able to give at a time of emergency.

This report deals with the work done by the Forest Service camps over the period from July 1 to September 12. A summary of the work done by the methods organization is given along with the results of the Forest Service operation. For a detailed account of the work performed by the methods unit, refer to the report on chemical eradication methods.

PURPOSE

1. Partial control of white pine blister rust through the eradication of Ribes from stream type.

2. Training personnel for future work.

For the spraying

work with a curved LOCATION AND DESCRIPTION OF AREA back frame, was done exclusively on this

The Ribes eradication activities were conducted on the Clearwater District of the Clearwater National Forest. Lolo Creek, Eldorado Creek,

சிவசூரி

NOTES

notice was furnished to the Office of Sister Ship Control.
 United States Coast Guard, and the United States Coast Guard
 was advised of the same. The Coast Guard was advised that the
 vessel was carrying 100,000 lbs. of explosives and was being
 towed by the tugboat "T-1" and was being towed to the
 port of Los Angeles for the purpose of being disposed of.

the methods used and known to be in use in the service of the United States and the fact that the United States has been in the habit of receiving information from the Soviet Union in connection with the activities of the Soviet Union in the United States and the fact that the United States has been in the habit of receiving information from the Soviet Union in connection with the activities of the Soviet Union in the United States.

1. The first of these is the fact that the majority of the population of the United States is of European descent. This is a fact which has been recognized by the government and the people of the United States for many years. It is a fact which has been recognized by the government and the people of the United States for many years.

There is a large number of people who are interested in the study of the history of the United States. The study of the history of the United States is a very important part of the education of every citizen. It is a study of the past, of the people who have lived in this country, and of the events that have shaped the nation. The study of the history of the United States is a study of the values and ideals that have guided the nation, and of the challenges that it has faced. It is a study of the triumphs and the failures of the nation, and of the lessons that can be learned from its experience. The study of the history of the United States is a study of the people who have made the nation what it is today, and of the role that each of us has played in its history. It is a study of the past, of the present, and of the future. It is a study of the United States, and of the world that it has helped to shape.

1000

3. Provisional personnel for future work.

1. The above information was obtained from the records of the Department of the Interior, Bureau of Land Management, and is being furnished to you for your information.

lower Musselshell Creek, Mud Creek, Cedar Creek, Dollar Creek, the lower end of Camp Creek and the East Fork of Lolo Creek were the principal areas worked. These streams occur in townships 34 and 35 north, ranges 6 and 7 east, with the work extending slightly into township 36 north, ranges 6 and 7 east.

The ground actually eradicated of Ribes by the camp engaged on methods studies forms an integral part of the area partially protected by stream type Ribes eradication performed by the Forest Service camps.

The timber in the region in which this stream type Ribes eradication was done is for the most part mature white pine. Some immature stands exist near the southern end of the district.

Within the area where the stream type Ribes eradication was done, control measures had been carried on during the preceding spring for the suppression of the white pine beetle.

Heavy concentrations of Ribes petiolare and R. lacustre are characteristic of the Musselshell region. Some of the heaviest concentrations remaining on the Clearwater Forest were encountered. Since heavy brush conditions prevailed, the difficulty factor was high. Many of the tributaries to the main drainages were of considerable length, having R. petiolare practically to their sources. Although approximately 90 man-days were spent constructing way trails into some of these areas, it was not advisable to do so in all cases. Consequently, a large amount of chemical had to be man-packed for considerable distances.

METHODS, EQUIPMENT AND MATERIALS

The project consisted of three 30-man units, with a camp boss, cook and flunky for each camp. The size of these units was satisfactory for the type of area encountered. The wide brushy stream type with heavy Ribes concentrations made progress slower and consequently it was necessary for each camp to move but twice.

One full-time pack string of eight mules and a saddle horse was hired for supplying the camps. As needed, the regular Forest Service pack string was engaged to do that packing which the other string could not handle. This packing schedule, through the excellent cooperation of the District Ranger made a very satisfactory arrangement.

For the spraying work, a knapsack unit, consisting of a 5-gallon tank with a curved back strapped to a Trapper Nelson pack frame, was used exclusively on this project. The tanks are constructed by Spokane firms securing the contract on bid. The Trapper Nelson pack frame is manufactured by Charles Trager, Seattle, Washington. This unit had been demonstrated,

lower Mississippi River, New Orleans, Baton Rouge, Natchez, the lower
end of Lake Charles and the lower end of Lake Caddo were the principal
points of interest. These places were in Louisiana and Mississippi.
The river was about 100 miles long, with a width of about 10 miles at
the mouth and a depth of about 10 feet. The river was about 10 miles
long, with a width of about 10 miles at the mouth and a depth of about 10 feet.

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The river was about 100 miles long, with a width of about 10 miles at
the mouth and a depth of about 10 feet. The river was about 10 miles
long, with a width of about 10 miles at the mouth and a depth of about 10 feet.

during the previous field season, to be the most satisfactory of all the units tested. The flexibility of the unit and the detachable pack frame made it very practical. The pack frame is used considerably in carrying chemicals and supplies into inaccessible areas.

Brown double-action pumps, manufactured by the E. C. Brown Company, Rochester, New York, were used and were very satisfactory. Some weaknesses were found. The manufacturer, on the suggestion of this office, has made some minor changes in the construction of the pump, which make it a very strong and durable unit, one which will stand the severe treatment which results from use in the brush.

Atiacide, a commercial chemical product manufactured by the Chipman Chemical Company, Boundbrook, New Jersey, was used for spraying H. petiolare. This chemical was used in the proportion of 1.4 pounds to each gallon of water. One-half or one-third pint of a stock solution, made by dissolving one pound of flake glue in three gallons of water, was used in each ten gallons of solution to provide a spreader which would aid in distributing the spray evenly over the bushes and also causing the spray to stick.

Heavy durable tubs of 10 to 14 gallons capacity were used as mixing containers.

For knapsack spraying, the individual section system was used. This method, in which a man is assigned to an individual block of stream type, permits the greatest output of work per man. This block is usually about 100 feet in length extending across the entire stream bottom. It is divided into strips by use of 3-ply sewing twine. At suitable locations along the stream, usually adjacent to each block, filling stations are established where the chemical is mixed and the men come to fill their spray tanks. The foreman of the crew lays out the blocks with string lines and mixes the chemical. He has either three or four men spraying in his crew, depending upon the concentration of H. petiolare.

Thus far chemicals, which are adaptable to field use, have been effective on H. petiolare only. This necessitated the eradication of the other two prevalent species, H. lacustre and H. inermis, by hand pulling methods. Generally the area was covered first by a crew of three men hand pulling these species. On some areas where H. petiolare was scattered, this species was also hand pulled, eliminating the necessity of covering the ground again. However, on the main drainages, the concentrations of H. petiolare required spraying in all cases.

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STATEMENT AND ANALYSIS OF COSTS

TABLE NO. 1

STATEMENT OF EXPENDITURES

| Item | | Amount |
|-----------------------|------------------------|-------------|
| Salaries | Supervision | \$2,134.00* |
| | Temporary | 8,567.96 |
| Subsistence | Salaries of cooks | 1,105.27 |
| | Cost of food | 3,741.04 |
| | Transportation of food | 401.37 |
| General | Cost | 1,345.80** |
| Equipment | Transportation | 496.09 |
| Spraying equipment | | 363.64 |
| Miscellaneous | Expenses | 82.98 |
| | Repairs | 50.00 |
| | Twine | 55.00 |
| Chemical | Cost | 1,871.70 |
| | Transportation | 485.20 |
| Transportation of men | | 7.50 |
| Total | | \$20,706.35 |

*Furnished by Office of Blister Rust Control.

**In calculating per acre costs, the cost of general equipment is charged off over a 3-year period.

In calculating per acre costs, the cost of spraying equipment is charged off over a 2-year period.

†† Cost charged against 1930 operations is \$19,626.40.

TABLE NO. 2

COST OF MEALS

| Item | Amount |
|------------------------|------------|
| Salaries of cooks | \$1,105.27 |
| Cost of food | 3,741.04 |
| Transportation of food | 401.37 |
| Total Cost | \$5,247.68 |

Number of meals.....12,254

Cost per meal.....\$.43

STATEMENT AND ANALYSIS OF COSTS

TABLE NO. 1

ANALYSIS OF COSTS

| Item | Amount |
|----------------|-----------|
| Salaries | 1,000.00 |
| Food | 2,000.00 |
| Transportation | 1,000.00 |
| Medical | 500.00 |
| Telephone | 200.00 |
| Postage | 100.00 |
| Printing | 50.00 |
| Supplies | 100.00 |
| Utilities | 100.00 |
| Insurance | 100.00 |
| Depreciation | 100.00 |
| Interest | 100.00 |
| Profit | 100.00 |
| Total | 10,000.00 |

Formulated by Bureau of Military and Naval Control.
 This statement is prepared for the purpose of showing the cost of operations.
 It is calculated on the basis of the cost of operations.
 It is charged off over a 3-year period.
 It is charged off over a 3-year period.
 It is charged off over a 3-year period.

TABLE NO. 2

COST OF MEALS

| Item | Amount |
|----------------|-----------|
| Salaries | 1,000.00 |
| Food | 2,000.00 |
| Transportation | 1,000.00 |
| Medical | 500.00 |
| Telephone | 200.00 |
| Postage | 100.00 |
| Printing | 50.00 |
| Supplies | 100.00 |
| Utilities | 100.00 |
| Insurance | 100.00 |
| Depreciation | 100.00 |
| Interest | 100.00 |
| Profit | 100.00 |
| Total | 10,000.00 |

Cost of meals.....

Cost per meal.....

WORK PERFORMED AND RESULTS OBTAINED

TABLE NO. 3

CHEMICAL ERADICATION OF CLEARWATER NATIONAL FOREST, 1930

| Method | Man-Days | Gallons Chemical | Acres Worked | Total Cost | Data Per Acre | | |
|----------|----------|------------------|--------------|------------|---------------|------------------|--------|
| | | | | | Man-Days | Gallons Chemical | Cost |
| Knapsack | 935 | 19,689 | 977 | \$8,903.57 | 0.96 | 20.2 | \$9.11 |

UNITED STATES OF AMERICA

1917

THE SECRETARY OF THE TREASURY

| DATE | AMOUNT | REMARKS | INITIALS | SIGNATURE | OFFICE | DATE |
|------|--------|----------------------|----------|-----------|--------|------|
| 1917 | 100.00 | PAID TO THE ORDER OF | | | | |
| 1917 | 100.00 | PAID TO THE ORDER OF | | | | |

THE SECRETARY OF THE TREASURY

1917

THE SECRETARY OF THE TREASURY

1917

TABLE NO. 4

INSECT TRADITION ON CLEARWATER NATIONAL FOREST, 1930

| Type | Acres | Total Cost | Number Hives Pulled | | | | Data per acre | |
|--------|-------|------------|---------------------|---------|---------|----------|---------------|----------------|
| | | | A. lac. | R. pet. | V. vis. | R. Iner. | San-
Days | Hives/ Cost |
| Stream | 1,000 | 10,122.73 | 410,130 | 41,521 | 10,597 | 29,543 | 493,761 | 0.84 258 15.30 |

TABLE NO. 5

TRANSMISSION SUMMARY ON CLEARWATER NATIONAL FOREST, 1930

| Type | Founders Chemical | Acres | Total Cost | Acres Partially Protected | Per Cent of Area Stream Type | Cost per Acre to eradicate | Cost per Acre for partial protection |
|--------|-------------------|-------|------------|---------------------------|------------------------------|----------------------------|--------------------------------------|
| | | | | | | | |
| Stream | 25,500 | 1,939 | 19,026.00 | 20,340 | 9.3 | 9.97 | 4.526 |

The acreage sprayed had Hives basins other than L. petiolare basin pulled. Hence it is a part of the acreage listed under Hives pulling and the two should not be added.

These tables
formed in 1930

The results of each acre of the insecticide service camp and the methods unit, as shown in Table No. 4, constitute a significant fact. A higher per acre work for acres worked in stream for the methods camp, but a lower cost per acre partially sprayed. The classifications upon which these costs are based refer to the acreage from which Hives were eradicated in the first case, and the acreage partially protected represents the total area surrounding a point of

RE-RADICATION OF CLEARWATER NATIONAL FOREST, 1930

RE-RADICATION OF CLEARWATER NATIONAL FOREST, 1930

TABLE NO. 6

| Type | Man-Days | Acres | Total Cost | Ribes Killed | | | Data Per Acre | | | |
|--------|----------|-------|------------|--------------|---------|--------|---------------|-------|--------|------------------------|
| | | | | R. lac. | R. pet. | Total | Man-Days | Ribes | Cost | Cost of 1st Radication |
| Stream | 88 | 246 | \$600.16 | 9,329 | 8,974 | 18,303 | 0.36 | 74 | \$2.44 | \$18.00 |

Note: During 1929 stream type ribes eradication was done on the Musselshell Creek drainage. For the purpose of securing necessary cost data on power as compared to knapsack methods, all species of ribes were sprayed. As the chemical was not fully effective on *R. lacustre*, and because one of the camps was advantageously located to remove a portion of this area, it was deemed advisable to do so.

(Area north and west of

TABLE NO. 7

SUMMARY OF ALL ERADICATION ON CLEARWATER NATIONAL FOREST, 1930*

Sioux on the Canyon

| Unit | Man-Days | Pounds Chemical | Acres Waxed | Total Cost | Acres Partially Protected | Per Cent Area Stream Type | Cost per acre to eradicate ribes | Cost per acre for partial eradication |
|----------------|----------|-----------------|-------------|-------------|---------------------------|---------------------------|----------------------------------|---------------------------------------|
| Forest Service | 2,535 | 21,900 | 1,909 | \$19,026.30 | 20,543 | 8.30 | \$9.97 | \$1.926 |
| B.R.C. Methods | 1,690 | 12,700 | 1,357 | 13,958.41 | 16,200 | 8.40 | 10.36 | .861 |
| Both | 4,225 | 36,600 | 3,266 | 32,984.71 | 36,743 | 8.89 | \$10.10 | \$1.898 |

*This table is shown here in order that all the eradication work performed in 1930 on the Clearwater National Forest might be summarized.

DISCUSSION AND ANALYSIS

A comparison of the results of work done by the three Forest Service camps and the methods unit, as shown in table No. 7, demonstrates a significant fact. A higher per acre cost for acres waxed is shown for the methods camp, but a lower cost per acre partially protected. The classifications upon which these costs are based refer to the actual acreage from which Ribes were eradicated in the first case, and the acreage partially protected represents the total area surrounding a particular

TABLE NO. 1

ANALYSIS OF DATA FROM THE 1930-1931

| Type | Area | Per-
cent | Total | Per-
cent | Total | Per-
cent | Total | Per-
cent | Total |
|-----------|-------|--------------|-------|--------------|-------|--------------|-------|--------------|-------|
| 1930-1931 | 1,200 | 100 | 1,200 | 100 | 1,200 | 100 | 1,200 | 100 | 1,200 |

Notes: During 1930-1931 the type Ribes eradication was done on the
 Muskegon National Forest. For the purpose of securing necessary cost
 data on power as compared to knapsack methods, all species of Ribes
 were sprayed. It is obvious that this method was not fully effective on R. fasciatus, and
 because one of the species was riverbank located as shown in previous
 this area, it was deemed advisable to do so.

TABLE NO. 2

SUMMARY OF ALL INFORMATION ON RIBES ERADICATION, 1930-1931

| Type | Area | Per-
cent | Total | Per-
cent | Total | Per-
cent | Total | Per-
cent | Total |
|-----------|-------|--------------|-------|--------------|-------|--------------|-------|--------------|-------|
| 1930-1931 | 1,200 | 100 | 1,200 | 100 | 1,200 | 100 | 1,200 | 100 | 1,200 |

*This table is shown here in order that all the information and data
 shown in Table No. 1 and the Muskegon National Forest report are in perspective.

DISCUSSION OF RESULTS

A comparison of the results of work done by the three forest
 service camps and the method used, as shown in Table No. 1, has revealed
 a significant fact. A slight, but not very great, difference in results
 for the methods used, and a lower cost per acre actually obtained.
 The classifications upon which these data are based rely in the main
 on the fact which Ribes were eradicated in the first case, and the extent
 of the Ribes eradicated in the second case.

PRELIMINARY RIBES ERADICATION SURVEY ON CLEARWATER NATIONAL FOREST, 1930

The highest cost of stream work was for the stream type work. The heaviest concentrations were selected. This accounts for the higher cost per acre worked by the TABLE NO. 8. However, the stream type on the areas worked by the other camps was greater. This was due to the fact that the stream type work was more extensive than the hillside work. Consequently the cost charged for stream type work was higher.

| Region | Size of Camp | Tons of Chemical | Total Cost |
|--|---------------|------------------|------------|
| Orofino Creek Drainage | 20-man | 3 | \$8,000 |
| French Creek Drainage | 15-man | 2 | \$5,000 |
| East and South Forks of French Creek | 12-man | 2 1/2 | \$6,000 |
| Orogrande Creek (including side tributaries from south and east) | 20-man | 7 | \$9,000 |
| Township 38 north, range 7 east (area north and west of Orogrande Creek) | 2 -
15-man | 11 | \$13,000 |

A very extensive survey was made of the stream type conditions on the Canyon District. Examination of the Larsen Creek, Rock Creek, Quartz Creek, Skull Creek and Isabella Creek drainages indicated that the Ribes on these streams were so scattered that stream type eradication alone would be impractical and that any eradication work performed on these areas should include the working of both stream and hillside. It is estimated that a crew of three or four men can do this clean-up work on the entire sprayed area covered in 1927 on the Canyon District.

3. The knapsack spraying equipment from two camps was taken to a fire. It was used to great advantage in retarding the spread of the fire and for putting out spot fires and burning snags. With due care in transporting of this equipment to and from the fire, this use has no detrimental effects on the equipment. When occasion demands, further use of the spraying equipment is recommended for fighting fires.

drainage which is relieved of a great proportion of the hazard from the blister rust by stream type eradication. For power spraying, the heaviest concentrations were selected. This accounts for the higher cost per acre worked by this method: camp. However, the percentage of stream type on the areas worked by the other camps was greater, which necessitated the working of a larger acreage to give partial protection to the surrounding area. Consequently the cost chargeable against this acreage was higher.

The cost of stream type eradication as charged against the acreage partially protected for the Musselshell District seems to be constant. The average cost per acre for the area protected in 1929 on Musselshell Creek was \$3.89 and for the 1930 operation it was \$.855.

CONCLUSIONS

1. For stream type eradication, a 24-man camp represents the largest unit which it is advisable to put in the field. On heavy Ribes concentrations as found on the Musselshell District, this size of unit was satisfactory. Where Ribes conditions are lighter, a smaller camp unit, probably about 15 men, would be more satisfactory. Such a unit would not be making so many camp moves.

2. During the year following initial eradication, a clean-up operation should be made on the sprayed areas. There is some survival of R. petiolare which is sprayed. These bushes can be easily destroyed by a re-spray. It is estimated that a crew of three or four men can do this clean-up work on the entire sprayed area covered in 1930 on the Musselshell District.

3. The knapsack spraying equipment from two camps was taken to a fire. It was used to great advantage in retarding the spread of the fire and for putting out spot fires and burning snags. With due care in the transporting of this equipment to and from the fire, this use has no detrimental effects on the equipment. When occasion demands, further use of the spraying equipment is recommended for fighting fires.

PRELIMINARY RIBES ERADICATION SURVEY OF THE PALOUSE DIVISION OF THE
ST. JOE NATIONAL FOREST

By
T. G. Guernsey, Junior Forester
and
H. Hartman, Agent

INTRODUCTION

A preliminary survey was made of the Palouse Division of the St. Joe National Forest during the latter part of September, 1930. This inspection was instigated by the Office of Blister Rust Control in view of the possibility of a local control program being carried on in that region during 1931.

There is a considerable amount of white pine of the younger age classes represented in the area. This fact will no doubt encourage the early working of the area to insure timely protection measures.

It has been found that a large portion of the area is owned by private holders with some Forest Service lands intermingled. This makes the advance of the necessary funds to carry on the work problematical. Depending upon the cooperative effort of the numerous interested parties, care of the protective work around the forest. The amount of chemical necessary to spray similar areas is estimated as follows:

1. To obtain such information on the area as is necessary for planning the field organization and methods of Ribes eradication when funds are available.

2. To obtain information on which to base an estimate of the amount of spraying equipment necessary and the amount of general equipment and chemicals required on the area.

It is estimated that the area is approximately 4,000 working acres. The Palouse Division of the St. Joe National Forest is located in townships 41, 42, 43 and 44 north, ranges 1, 2, 3, 4, and 5 west, Boise Meridian.

In general the area is characterized by valuable white pine and western yellow pine stands. The larger portion of these stands is in the advanced reproduction and pole stages.

RESULTS OF WORK

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CONCLUSIÓN

TABLE 1 AREA DATA

| Area Type | Area to be Surveyed | Number of Acres | Area Type | Area to be Surveyed | Number of Acres |
|-----------|---------------------|-----------------|-----------|---------------------|-----------------|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 |
| 37 | 38 | 39 | 40 | 41 | 42 |
| 43 | 44 | 45 | 46 | 47 | 48 |
| 49 | 50 | 51 | 52 | 53 | 54 |
| 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 |
| 67 | 68 | 69 | 70 | 71 | 72 |
| 73 | 74 | 75 | 76 | 77 | 78 |
| 79 | 80 | 81 | 82 | 83 | 84 |
| 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 |
| 97 | 98 | 99 | 100 | 101 | 102 |
| 103 | 104 | 105 | 106 | 107 | 108 |
| 109 | 110 | 111 | 112 | 113 | 114 |
| 115 | 116 | 117 | 118 | 119 | 120 |
| 121 | 122 | 123 | 124 | 125 | 126 |
| 127 | 128 | 129 | 130 | 131 | 132 |
| 133 | 134 | 135 | 136 | 137 | 138 |
| 139 | 140 | 141 | 142 | 143 | 144 |
| 145 | 146 | 147 | 148 | 149 | 150 |
| 151 | 152 | 153 | 154 | 155 | 156 |
| 157 | 158 | 159 | 160 | 161 | 162 |
| 163 | 164 | 165 | 166 | 167 | 168 |
| 169 | 170 | 171 | 172 | 173 | 174 |
| 175 | 176 | 177 | 178 | 179 | 180 |
| 181 | 182 | 183 | 184 | 185 | 186 |
| 187 | 188 | 189 | 190 | 191 | 192 |
| 193 | 194 | 195 | 196 | 197 | 198 |
| 199 | 200 | 201 | 202 | 203 | 204 |
| 205 | 206 | 207 | 208 | 209 | 210 |
| 211 | 212 | 213 | 214 | 215 | 216 |
| 217 | 218 | 219 | 220 | 221 | 222 |
| 223 | 224 | 225 | 226 | 227 | 228 |
| 229 | 230 | 231 | 232 | 233 | 234 |
| 235 | 236 | 237 | 238 | 239 | 240 |
| 241 | 242 | 243 | 244 | 245 | 246 |
| 247 | 248 | 249 | 250 | 251 | 252 |
| 253 | 254 | 255 | 256 | 257 | 258 |
| 259 | 260 | 261 | 262 | 263 | 264 |
| 265 | 266 | 267 | 268 | 269 | 270 |
| 271 | 272 | 273 | 274 | 275 | 276 |
| 277 | 278 | 279 | 280 | 281 | 282 |
| 283 | 284 | 285 | 286 | 287 | 288 |
| 289 | 290 | 291 | 292 | 293 | 294 |
| 295 | 296 | 297 | 298 | 299 | 300 |
| 301 | 302 | 303 | 304 | 305 | 306 |
| 307 | 308 | 309 | 310 | 311 | 312 |
| 313 | 314 | 315 | 316 | 317 | 318 |
| 319 | 320 | 321 | 322 | 323 | 324 |
| 325 | 326 | 327 | 328 | 329 | 330 |
| 331 | 332 | 333 | 334 | 335 | 336 |
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| 343 | 344 | 345 | 346 | 347 | 348 |
| 349 | 350 | 351 | 352 | 353 | 354 |
| 355 | 356 | 357 | 358 | 359 | 360 |
| 361 | 362 | 363 | 364 | 365 | 366 |
| 367 | 368 | 369 | 370 | 371 | 372 |
| 373 | 374 | 375 | 376 | 377 | 378 |
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| 553 | 554 | 555 | 556 | 557 | 558 |
| 559 | 560 | 561 | 562 | 563 | 564 |
| 565 | 566 | 567 | 568 | 569 | 570 |
| 571 | 572 | 573 | 574 | 575 | 576 |
| 577 | 578 | 579 | 580 | 581 | 582 |
| 583 | 584 | 585 | 586 | 587 | 588 |
| 589 | 590 | 591 | 592 | 593 | 594 |
| 595 | 596 | 597 | 598 | 599 | 600 |
| 601 | 602 | 603 | 604 | 605 | 606 |
| 607 | 608 | 609 | 610 | 611 | 612 |
| 613 | 614 | 615 | 616 | 617 | 618 |
| 619 | 620 | 621 | 622 | 623 | 624 |
| 625 | 626 | 627 | 628 | 629 | 630 |
| 631 | 632 | 633 | 634 | 635 | 636 |
| 637 | 638 | 639 | 640 | 641 | 642 |
| 643 | 644 | 645 | 646 | 647 | 648 |
| 649 | 650 | 651 | 652 | 653 | 654 |
| 655 | 656 | 657 | 658 | 659 | 660 |
| 661 | 662 | 663 | 664 | 665 | 666 |
| 667 | 668 | 669 | 670 | 671 | 672 |
| 673 | 674 | 675 | 676 | 677 | 678 |
| 679 | 680 | 681 | 682 | 683 | 684 |
| 685 | 686 | 687 | 688 | 689 | 690 |
| 691 | 692 | 693 | 694 | 695 | 696 |
| 697 | 698 | 699 | 700 | 701 | 702 |
| 703 | 704 | 705 | 706 | 707 | 708 |
| 709 | 710 | 711 | 712 | 713 | 714 |
| 715 | 716 | 717 | 718 | 719 | 720 |
| 721 | 722 | 723 | 724 | 725 | 726 |
| 727 | 728 | 729 | 730 | 731 | 732 |
| 733 | 734 | 735 | 736 | 737 | 738 |
| 739 | 740 | 741 | 742 | 743 | 744 |
| 745 | 746 | 747 | 748 | 749 | 750 |
| 751 | 752 | 753 | 754 | 755 | 756 |
| 757 | 758 | 759 | 760 | 761 | 762 |
| 763 | 764 | 765 | 766 | 767 | 768 |
| 769 | 770 | 771 | 772 | 773 | 774 |
| 775 | 776 | 777 | 778 | 779 | 780 |
| 781 | 782 | 783 | 784 | 785 | 786 |
| 787 | 788 | 789 | 790 | 791 | 792 |
| 793 | 794 | 795 | 796 | 797 | 798 |
| 799 | 800 | 801 | 802 | 803 | 804 |
| 805 | 806 | 807 | 808 | 809 | 810 |
| 811 | 812 | 813 | 814 | 815 | 816 |
| 817 | 818 | 819 | 820 | 821 | 822 |
| 823 | 824 | 825 | 826 | 827 | 828 |
| 829 | 830 | 831 | 832 | 833 | 834 |
| 835 | 836 | 837 | 838 | 839 | 840 |
| 841 | 842 | 843 | 844 | 845 | 846 |
| 847 | 848 | 849 | 850 | 851 | 852 |
| 853 | 854 | 855 | 856 | 857 | 858 |
| 859 | 860 | 861 | 862 | 863 | 864 |
| 865 | 866 | 867 | 868 | 869 | 870 |
| 871 | 872 | 873 | 874 | 875 | 876 |
| 877 | 878 | 879 | 880 | 881 | 882 |
| 883 | 884 | 885 | 886 | 887 | 888 |
| 889 | 890 | 891 | 892 | 893 | 894 |
| 895 | 896 | 897 | 898 | 899 | 900 |
| 901 | 902 | 903 | 904 | 905 | 906 |
| 907 | 908 | 909 | 910 | 911 | 912 |
| 913 | 914 | 915 | 916 | 917 | 918 |
| 919 | 920 | 921 | 922 | 923 | 924 |
| 925 | 926 | 927 | 928 | 929 | 930 |
| 931 | 932 | 933 | 934 | 935 | 936 |
| 937 | 938 | 939 | 940 | 941 | 942 |
| 943 | 944 | 945 | 946 | 947 | 948 |
| 949 | 950 | 951 | 952 | 953 | 954 |
| 955 | 956 | 957 | 958 | 959 | 960 |
| 961 | 962 | 963 | 964 | 965 | 966 |
| 967 | 968 | 969 | 970 | 971 | 972 |
| 973 | 974 | 975 | 976 | 977 | 978 |
| 979 | 980 | 981 | 982 | 983 | 984 |
| 985 | 986 | 987 | 988 | 989 | 990 |
| 991 | 992 | 993 | 994 | 995 | 996 |
| 997 | 998 | 999 | 1000 | 1001 | 1002 |
| 1003 | 1004 | 1005 | 1006 | 1007 | 1008 |
| 1009 | 1010 | 1011 | 1012 | 1013 | 1014 |
| 1015 | 1016 | 1017 | 1018 | 1019 | 1020 |
| 1021 | 1022 | 1023 | 1024 | 1025 | 1026 |
| 1027 | 1028 | 1029 | 1030 | 1031 | 1032 |
| 1033 | 1034 | 1035 | 1036 | 1037 | 1038 |
| 1039 | 1040 | 1041 | 1042 | 1043 | 1044 |
| 1045 | 1046 | 1047 | 1048 | 1049 | 1050 |
| 1051 | 1052 | 1053 | 1054 | 1055 | 1056 |
| 1057 | 1058 | 1059 | 1060 | 1061 | 1062 |
| 1063 | 1064 | 1065 | 1066 | 1067 | 1068 |
| 1069 | 1070 | 1071 | 1072 | 1073 | 1074 |
| 1075 | 1076 | 1077 | 1078 | 1079 | 1080 |
| 1081 | 1082 | 1083 | 1084 | 1085 | 1086 |
| 1087 | 1088 | 1089 | 1090 | 1091 | 1092 |
| 1093 | 1094 | 1095 | 1096 | 1097 | 1098 |
| 1099 | 1100 | 1101 | 1102 | 1103 | 1104 |
| 1105 | 1106 | 1107 | 1108 | 1109 | 1110 |
| 1111 | 1112 | 1113 | 1114 | 1115 | 1116 |
| 1117 | 1118 | 1119 | 1120 | 1121 | 1122 |
| 1123 | 1124 | 1125 | 1126 | 1127 | 1128 |
| 1129 | 1130 | 1131 | 1132 | 1133 | 1134 |
| 1135 | 1136 | 1137 | 1138 | 1139 | 1140 |
| 1141 | 1142 | 1143 | 1144 | 1145 | 1146 |
| 1147 | 1148 | 1149 | 1150 | 1151 | 1152 |
| 1153 | 1154 | 1155 | 1156 | 1157 | 1158 |
| 1159 | 1160 | 1161 | 1162 | 1163 | 1164 |
| 1165 | 1166 | 1167 | 1168 | 1169 | 1170 |
| 1171 | 1172 | 1173 | 1174 | 1175 | 1176 |
| 1177 | 1178 | 1179 | 1180 | 1181 | 1182 |
| 1183 | 1184 | 1185 | 1186 | 1187 | 1188 |
| 1189 | 1190 | 1191 | 1192 | 1193 | 1194 |
| 1195 | 1196 | 1197 | 1198 | 1199 | 1200 |
| 1201 | 1202 | 1203 | 1204 | 1205 | 1206 |
| 1207 | 1208 | 1209 | 1210 | 1211 | 1212 |
| 1213 | 1214 | 1215 | 1216 | 1217 | 1218 |
| 1219 | 1220 | 1221 | 1222 | 1223 | 1224 |
| 1225 | 1226 | 1227 | 1228 | 1229 | 1230 |
| 1231 | 1232 | 1233 | 1234 | 1235 | 1236 |
| 1237 | 1238 | 1239 | 1240 | 1241 | 1242 |
| 1243 | 1244 | 1245 | 1246 | 1247 | 1248 |
| 1249 | 1250 | 1251 | 1252 | 1253 | 1254 |
| 1255 | 1256 | 1257 | 1258 | 1259 | 1260 |
| 1261 | 1262 | 1263 | 1264 | 1265 | 1266 |
| 1267 | 1268 | 1269 | 1270 | 1271 | 1272 |
| 1273 | 1274 | 1275 | 1276 | 1277 | 1278 |
| 1279 | 1280 | 1281 | 1282 | 1283 | 1284 |
| 1285 | 1286 | 1287 | 1288 | 1289 | 1290 |
| 1291 | 1292 | 1293 | 1294 | 1295 | 1296 |
| 1297 | 1298 | 1299 | 1300 | 1301 | 1302 |
| 1303 | 1304 | 1305 | 1306 | 1307 | 1308 |
| 1309 | 1310 | 1311 | 1312 | 1313 | 1314 |
| 1315 | 1316 | 1317 | 1318 | 1319 | 1320 |
| 1321 | 1322 | 1323 | 1324 | 1325 | 1326 |
| 1327 | 1328 | 1329 | 1330 | 1331 | 1332 |
| 1333 | 1334 | 1335</ | | | |

PRELIMINARY RIBES ERADICATION SURVEY
PRIEST RIVER EXPERIMENT STATION
1930.

By
C. C. Strong
Associate Forester

White pine blister rust is now firmly established in Idaho. Although no blister rust, either on Ribes or white pines, has yet been found within about 5 miles of the Priest River experimental forest, there is no reason to believe that it will not soon become established on this area or that it might not already be present. Many investigations are under way on the experimental forest with which the advent of blister rust would doubtless play havoc. For this reason the Director of the Northern Rocky Mountain Experiment Station requested the personnel of the Office of Blister Rust Control to make a preliminary survey of the area to determine what area would have to be cleared of Ribes to protect the pines on the forest and the probable cost of such work.

RIBES CONDITIONS

The bulk of the experimental forest is included in the Benton and South Fork of East River drainages. Ribes conditions are not severe with certain small burns excepted.

The Lower East River drainage was found to contain very extensive areas of heavy brush through which a tangled mass of Ribes inermis is generally distributed. It is extremely doubtful if the white pine on lower Benton Creek and the lower portion of the South Fork of East River could be given adequate protection without the removal of Ribes from East River to a point about one mile northeast of the bridge on the Priest River-Coolin road.

ESTIMATED COST OF RIBES ERADICATION

By hand pulling methods it is estimated that it will cost not less than \$1,500.00 to work once over the East River area necessary to be worked. However, hand pulling is so ineffective for permanently suppressing R. inermis where it is present in such masses, it would seem better to let this area wait a year pending the field testing of new methods of killing Ribes with chemicals which show promise of doing the job much more effectively and at a much lower cost than results from hand pulling.

The Benton Creek and South Fork of East River drainages are adapted to hand pulling methods only and the work can be done at any time. It is estimated that \$5,000.00 will be sufficient to cover this area plus a small amount of area bordering which would serve as a protective strip. That area (Big Creek drainage) immediately to the south of the experimental forest, already having been worked, will serve as a protection zone.



W.323 - Ribes inerme growing entwined with brush - willows in this instance. Typical of R. inerme. It is very difficult to do an effective eradication job on R. inerme in such a situation.



W.380 - Thrifty stand of western white pine on the South Fork of Reed's Creek on the C.T.P.A. The value of protection of pine from white pine blister rust in such stands is beyond question.

COOPERATIVE LOCAL CONTROL, CLEARWATER TIMBER PROTECTIVE
ASSOCIATION

By B. A. Anderson,
Junior Forester

INTRODUCTION

One of the reasons for selecting the Reed's Creek drainage upon which to start the control program in 1929 was the finding of blister rust infections on the leaves of *Ribes petiolare* near Headquarters, Idaho. During the summer of 1929 pine infections were found in the same drainage and in 1930 scouting work revealed four additional pine infection centers on Clearwater Timber Protective Association lands. These infections were found on:

1. North Fork Reed's Creek, near Headquarters, township 38 north, range 5 east, section 15.
2. Quartz Creek near Headquarters, township 37 north, range 5 east, section 5.
3. Rhodes Creek near Pierce, township 36 north, range 5 east, section 13.
4. Crofino Creek near Pierce.

Of these the Quartz Creek area is perhaps the most heavily infected. On this area discovery of the rust on *R. petiolare* led to a careful examination of the pines in the immediate vicinity which disclosed dozens of cankers. The cankers were probably of 1927 origin. No fruiting cankers were found but the heavy infections found on currants are an almost certain indication that a closer search would disclose some in the immediate vicinity. The stream type on this area was cleared of all *Ribes* a few days after the discovery of the infection.

After the eradication camps were closed in the fall of 1929 a preliminary *Ribes* eradication survey was made on the unworked tributaries of Reed's Creek. Information regarding *Ribes* conditions and possible camp sites was secured.

In 1930 a much larger number of men were employed on blister rust work on the Clearwater Timber Protective Association than in 1929, the force being increased by about half.

PURPOSES OF WORK

1. To continue complete eradication of all *Ribes* in the stream type of white pine areas to control white pine blister rust.

THE CALIFORNIA LOCAL CONTROL, ELABORATE SYSTEM

ASSOCIATION

By

B. A. Anderson,
Junior Forester

INTRODUCTION

One of the reasons for selecting the local control system was the fact that the local control system is the most effective method of controlling the spread of disease. During the summer of 1930 pine plantations were found in the same district and in 1931 another was found in the same district. These infections were found on:

1. North Fork Lake's Creek, near Headwaters, Township 10 North, Range 5 East, Section 15.

2. South Fork Lake's Creek, near Headwaters, Township 10 North, Range 5 East, Section 15.

3. South Fork Lake's Creek, near Headwaters, Township 10 North, Range 5 East, Section 15.

4. South Fork Lake's Creek, near Headwaters, Township 10 North, Range 5 East, Section 15.

On these four local control sites is perhaps the most intensive investigation of the spread of disease. On this site the local control system is the most effective method of controlling the spread of disease. During the summer of 1930 pine plantations were found in the same district and in 1931 another was found in the same district. These infections were found on:

After the eradication camp was closed in the fall of 1931 a preliminary field eradication survey was made on the infected sites of local control. Information regarding the local control system was secured.

In 1931 a much larger number of men were employed on the local control system. The force being increased by about half.

PURPOSES OF WORK

1. To conduct complete eradication of all sites in the system of local control.

2. To develop personnel for future work.

LOCATION AND DESCRIPTION OF AREA

Stream type Ribes eradication was completed on 21,500 acres in the upper Reed's Creek drainage in 1928. During 1930 the same type of work was continued and completed on Reed's Creek and all its tributaries, Big Slide and Evans creeks, Poorman Creek with all its tributaries, and the headwaters of Quartz Creek from the mouth of Beaver Creek in township 37 north, range 5 east.

These drainages include the southern portion of township 39 north, ranges 4 and 5 east, all of township 38 north, ranges 4 and 5 east, a portion of the northeast of township 37 north, range 4 east, and a portion of the west half of township 37 north, range 5 east.

R. petiolare did not occur as heavily on the areas worked this year as it did on the headwaters of Reed's Creek. Very few R. petiolare bushes were found on Slide, Evans, Big, Baby and Gold creeks or on the lower seven miles of Reed's Creek. Relatively few R. petiolare bushes were found on Poorman Creek. Heavy concentrations, however, were found on Casey and Meadow creeks, all of Parallel Creek and the upper reaches of Reed's, Snake and Quartz creeks.

R. inermis, the white-stemmed gooseberry, was found in only one locality in heavy concentrations - on Meadow Creek above the old dam near the township line.

R. lacustre bushes were scattered generally over all of the area. A few bushes of R. irriguum were found on lower Snake Creek.

Practically all of the area is covered with fine stands of white pine. Logging has been done on part of the Big, Slide and Evans creek areas and also on part of the Quartz Creek drainage. The cut has been made on a sustained yield basis, all slashings and debris have been piled and burned.

The topography of lower Reed's Creek is much more rugged than its headwaters. For approximately eight or nine miles from its mouth, Reed's Creek flows through what might almost be designated as a canyon. Very little stream type is found along the creek, the slopes on each side rising almost precipitously from the stream.

On lower Reed's Creek east of Big Island there is a rather extensive area which was burned over several years ago. The entire drainage of Christmas Creek, a tributary of Gold Creek, has been burned over, the fire occurring about the same time as the lower Reed's Creek fire.

Table No. 1 is a summary of the hand-pulling work and No. 2 is a summary of the chemical work on the Christmas Creek fire.

LOCALITY AND ELEVATION

These findings indicate that the portion of the population of the United States which is in the lowest income group is the largest and that the portion of the population in the highest income group is the smallest. This is in contrast to the findings of the 1950 Census which showed that the portion of the population in the highest income group was the largest and the portion in the lowest income group was the smallest.

4. Goldfish did not occur as heavily on the above waters as they did on the waters of Deer's Creek. Very few goldfish were found on Little, Evans, and Gold Creek or the lower reaches of Deer's Creek. Goldfish were found on Evans Creek. Small concentrations, however, were found on Deer's Creek. All of Deer's Creek and the lower reaches of Deer's, Evans and Little Creeks.

E. Inland, the well-known locality, was found in only one lot of the same material - or rather from above the old dam near the township line.

...a few days of ...

It is a very old and famous place, and is one of the most important in the country. It is situated on the banks of the River, and is one of the most beautiful places in the country. It is a very old and famous place, and is one of the most important in the country. It is situated on the banks of the River, and is one of the most beautiful places in the country.

[illegible]

METHODS AND EQUIPMENT

The men were divided into four 15-man units. These units were smaller than the units used in 1929. The change in the size of camps was made because of the relative immobility of the larger camp. In a region where fewer Ribes are found it is necessary to move camp from three to six times a season. Mobility of units in such cases is of paramount importance.

A pack string of 8 mules was used to move camp equipment, distribute grub supplies and chemical to camps which could not be reached by truck. A half-ton Chevrolet truck was used to handle supplies for those camps located on roads. During the latter part of the season it was found necessary to press into service a ton and a half truck. Camps were so located that back country which could be reached only by pack string was worked during the first part of the season. Thus it was possible to dispense with the pack string about the 20th of August. When required, a pack string was secured from the Clearwater Timber Protective Association.

The Clearwater Timber Company furnished warehouse space for supplies at Headquarters, Idaho.

A. Hand-pulling Methods

At the present time it is possible to get a 100 per cent kill on only one species of Ribes, R. petiolare, with but one application of chemical. Therefore it is necessary to hand pull all other species. Scattered R. petiolare bushes are hand pulled.

Men are divided into 3-man crews with the foreman working in the center of the line where he can keep somewhat of a check on the kind of work being done by the other men. Crew strips are marked by string. 3 and 4-man crews have been found to give better efficiency than the larger crews.

B. Knapsack Spraying

During hand pulling all concentrations of R. petiolare were located and later chemical crews sprayed these bushes with a 10 per cent solution of Atlacide. Very little NaClO_3 was used. Chemical crews were composed of three crewmen and a foreman, the foreman mixing the chemical and laying the boundaries of individual blocks and strips for the men.

WORK PERFORMED AND RESULTS

Table No. 1 is a summary of the hand-pulling work and Table No. 2 is a summary of the chemical work on the Clearwater Timber Protective Association.

THE CHINESE

The men were divided into two groups. One group was made up of the Chinese who were in the city of Shanghai. The other group was made up of the Chinese who were in the city of Peking. The Chinese who were in the city of Shanghai were in a better position than the Chinese who were in the city of Peking. The Chinese who were in the city of Shanghai were in a better position than the Chinese who were in the city of Peking.

The Chinese who were in the city of Shanghai were in a better position than the Chinese who were in the city of Peking. The Chinese who were in the city of Shanghai were in a better position than the Chinese who were in the city of Peking. The Chinese who were in the city of Shanghai were in a better position than the Chinese who were in the city of Peking. The Chinese who were in the city of Shanghai were in a better position than the Chinese who were in the city of Peking.

The Chinese who were in the city of Shanghai were in a better position than the Chinese who were in the city of Peking. The Chinese who were in the city of Shanghai were in a better position than the Chinese who were in the city of Peking. The Chinese who were in the city of Shanghai were in a better position than the Chinese who were in the city of Peking.

4. Hand-pulling Method

The hand-pulling method is a method of pulling a rope. It is a method of pulling a rope. It is a method of pulling a rope. It is a method of pulling a rope. It is a method of pulling a rope.

The hand-pulling method is a method of pulling a rope. It is a method of pulling a rope. It is a method of pulling a rope. It is a method of pulling a rope. It is a method of pulling a rope.

5. Rope-pulling Method

The rope-pulling method is a method of pulling a rope. It is a method of pulling a rope. It is a method of pulling a rope. It is a method of pulling a rope. It is a method of pulling a rope.

WORK EXPERIMENT AND RESULTS

The work experiment and results are as follows. The work experiment and results are as follows. The work experiment and results are as follows. The work experiment and results are as follows. The work experiment and results are as follows.



W.375 - Photograph taken in 1930 of an area of Ribes petiolare sprayed in 1929 with a 10% solution of Atlacide. An almost 100% kill was secured. Two living twigs can be seen, one in the left and the other in the right hand corner of the picture. Follow-up operations the following year will catch these shoots.



W.384 - Photograph taken in 1930 of an area of Ribes petiolare sprayed with 10% solution of Atlacide in 1929. A complete kill was secured although a portion of the bushes was immersed in water during the spraying operation.

Two operations are necessary in special cases. The second is
times caused by the heat-shrink method in order to remove loose material
of lines which are not accessible to chemical; later the damaged
cables cover the same ground as the first. The total amount
shown in Table No. 1 as heat-shrink cable is therefore included
and 100% cable covered by the special method.

TABLE NO. 1

RESULTS BY THE HAND-PULLING RIBES ERADICATION METHOD

| Camp No. | Acres worked | Ribes Eradicated | | | | | | Total | |
|--------------------|--------------|------------------|---------|----------|---------|---------|---------|----------|----------|
| | | R. irrig. | R. inc. | R. iner. | R. pet. | R. vis. | Total | Per Acre | Man-Days |
| 1 | 891.00 | 5,243 | 114,224 | 23,773 | 4,488 | | 147,728 | 165.8 | 637.00 |
| 2 | 1,011.20 | | 161,291 | 4,392 | 2,507 | | 168,180 | 166.3 | 634.75 |
| 3 | 518.80 | 65 | 185,043 | 4,686 | 3,403 | 2,923 | 196,120 | 378.0 | 578.00 |
| 4 | 633.95 | | 89,920 | 27,238 | 373 | 1,250 | 118,781 | 187.4 | 553.25 |
| Totals or Averages | 3,054.95 | 5,313 | 550,478 | 60,089 | 10,771 | 4,173 | 630,824 | 206.5 | 2,403.10 |
| | | | | | | | | | 1.27 |

Ribes averages reported for above means about same as percentage total pulled. (Note: 1.27 is 206.5 divided by 165.8, which is the average of the 165.8 and 187.4, and 1.27 is the average of the 1.40 and 1.15.)

TABLE NO. 2

RESULTS OF RICES BRADICATION BY SPRAYING METHODS ON CLEARWATER TIMBER PROTECTIVE ASSOCIATION

| Camp Number | Light | | | | | | Medium | | | | | | Heavy | | | | | |
|--------------------|----------|--------|-------------|-------------------|----------------------|----------|--------|-------------|-------------------|----------------------|----------|-------|-------------|-------------------|----------------------|----------|-------|----------------------|
| | Man-Days | Acres | Gals. Spray | Acres Per Man-Day | Gals. Spray Per Acre | Man-Days | Acres | Gals. Spray | Acres Per Man-Day | Gals. Spray Per Acre | Man-Days | Acres | Gals. Spray | Acres Per Man-Day | Gals. Spray Per Acre | Man-Days | Acres | Gals. Spray Per Acre |
| 1 | 29.75 | 15.50 | 579 | 0.52 | 37.25 | 82.75 | 35.0 | 1,941 | 0.44 | 53.92 | 39 | 11.0 | 1,242 | 0.28 | 112.91 | | | |
| 2 | 165.12 | 144.70 | 2,193 | 0.88 | 16.16 | 151.00 | 74.3 | 2,252 | 0.49 | 43.77 | 67 | 16.4 | 1,701 | 0.24 | 103.72 | | | |
| 3 | 45.00 | 29.50 | 625 | 0.66 | 21.19 | 102.75 | 46.1 | 2,330 | 0.44 | 57.05 | | | | | | | | |
| 4 | 177.25 | 133.15 | 2,753 | 0.75 | 20.68 | 55.00 | 30.2 | 1,082 | 0.37 | 35.83 | 4 | 1.0 | 126 | 0.25 | 125.00 | | | |
| Totals or Averages | 417.12 | 322.85 | 6,150 | 0.77 | 19.05 | 390.50 | 186.6 | 8,905 | 0.48 | 47.72 | 110 | 28.4 | 3,068 | 0.26 | 108.03 | | | |

| Total | | | | | |
|--------------------|----------|--------|-------------|-------------------|----------------------|
| Camp Number | Man-Days | Acres | Gals. Spray | Acres Per Man-Day | Gals. Spray Per Acre |
| 1 | 151.50 | 62.50 | 3,762 | 0.41 | 60.19 |
| 2 | 363.12 | 235.40 | 7,146 | 0.61 | 30.36 |
| 3 | 145.75 | 75.00 | 3,255 | 0.51 | 43.08 |
| 4 | 174.25 | 134.35 | 3,980 | 0.70 | 24.09 |
| Totals or Averages | 917.62 | 537.85 | 18,123 | 0.59 | 36.70 |

The acreage sprayed had ribes buccines other than K. petiolare hand pulled. Hence it is a part of the acreage listed under hand pulling and the two should not be added.

STATEMENT AND ANALYSIS OF COSTS

TABLE NO. 3

COST OF OPERATIONS

| Item | | Total Cost |
|-----------------------|------------------------|-------------|
| Salaries | Supervisors | \$ 2,472.76 |
| | Temporary Men | 14,902.83 |
| Subsistence | Salaries of cooks | 1,779.88 |
| | Cost of food | 3,506.19 |
| | Transportation of food | 697.95 |
| | Cost | 660.68 |
| General Equipment | Transportation | 574.07 |
| Spraying Equipment | Cost | 413.85 |
| Miscellaneous | Supplies | 108.47 |
| | Expenses | 195.76 |
| | Repairs | 17.06 |
| | Twine | 75.93 |
| Chemical | Cost | 2,088.00 |
| | Transportation | 614.00 |
| Transportation of men | | 507.54 |
| Total | | \$30,612.31 |

The above table shows the actual expenditures by eradication forces on the Clearwater Timber Protective Association lands for the period May 1 to October 31, inclusive. This period includes the actual eradication period and also the time necessary for preliminary hives eradication survey in the fall.

For the actual hives eradication work two dollars of Federal money was spent for each dollar of Association funds. Upon this basis the Bureau of Plant Industry expended \$30,000 and the Association \$10,000 for this work.

Upon the basis of \$30,000* allotment of funds in 1930, hives were removed from 3,055 acres of stream type at a cost of \$9.82 per acre of stream bottom actually worked and \$0.45 per acre for the total area (61,000 acres) to which this type of protection was applied. The material decrease in cost per acre secured in 1930 was due to (1) more favorable working conditions, and (2) better efficiency in methods.

*It will be noted that this does not check with the actual expenditures shown in the table. In 1929 all the cooperative funds were not expended. It therefore became necessary to expend, in 1930, the regular allotment plus the amount of the deficit in 1929. Since the full \$30,000 was used as the cost of the job in 1929 it was deemed best to use \$30,000 as the actual cost of the work in 1930.

11. 11. 1952

as the actual cost of the work in 1950.

TABLE NO. 4
MEAL COSTS

| Camp No. | Items | | | | Number Meals Served | Average Cost Per Meal |
|--------------------|-------------------|------------|-----------------|------------|---------------------|-----------------------|
| | Salaries of Cooks | Food Costs | Transp. of Food | Total Cost | | |
| 1 | \$ 444.20 | \$1,394.96 | 174.49 | \$2,013.65 | 4,385 | \$0.460 |
| 2 | 444.03 | 1,387.82 | 174.49 | 2,006.34 | 4,700 | 0.427 |
| 3 | 444.42 | 1,304.31 | 174.49 | 1,923.22 | 4,158 | 0.462 |
| 4 | 446.93 | 1,106.26 | 174.48 | 1,727.67 | 4,047 | 0.427 |
| Totals or Averages | \$1,779.88 | \$5,193.35 | \$697.95 | \$7,671.18 | 17,190 | \$0.446 |

In figuring food costs a reduction of \$312.84, the value of food on hand at the end of the field season, was made from the total grub cost of \$5,506.19.

Regular flunkies were not used. One man in each camp was picked to help with flunky work for two hours each night and Sundays, for which he was paid approximately \$10 a month additional.

DISCUSSION AND ANALYSIS

1. Meal costs were a few cents less than in 1929 but a greater saving can undoubtedly be made. Heretofore green stuff has been purchased through local stores. About the middle of the season arrangements were made to buy green stuff direct from growers, delivered by them to Headquarters, Idaho. This arrangement proved more satisfactory.

2. 15-man units proved very satisfactory for stream type eradication because of the frequent moves; each camp moving from two to four times during the season. When hillside eradication is started it will probably be advisable to use a larger unit.

3. *R. inerne* offers a special problem. So far it has been found impossible to secure more than a 20 per cent kill by spraying on this species. A rather dense patch of *R. inerne* occurred on Meadow Creek growing along the stream in a mixture of willows and timothy. The patch was hand pulled but it is quite certain that it did little permanent good. An inspection of this area within a year or so will probably reveal much *R. inerne* regrowth.

RECOMMENDATIONS

1. At the present rate of progress it will take four or five years

| No. | Amount | | | | Total |
|-------|----------|----------|----------|----------|-----------|
| | 1941 | 1942 | 1943 | 1944 | |
| 1 | 1,000.00 | 1,000.00 | 1,000.00 | 1,000.00 | 4,000.00 |
| 2 | 1,000.00 | 1,000.00 | 1,000.00 | 1,000.00 | 4,000.00 |
| 3 | 1,000.00 | 1,000.00 | 1,000.00 | 1,000.00 | 4,000.00 |
| 4 | 1,000.00 | 1,000.00 | 1,000.00 | 1,000.00 | 4,000.00 |
| Total | | | | | 16,000.00 |

On 11/11/44, the value of the stock was \$1,000.00. The value of the stock on 11/11/44 was \$1,000.00. The value of the stock on 11/11/44 was \$1,000.00.

Regular dividend was not paid. One was in each camp was given to help with living costs for the month of April and May, for which he was not compensated in a separate bill.

DISCUSSION AND CONCLUSIONS

1. The results of the study show that the value of the stock was \$1,000.00. The value of the stock on 11/11/44 was \$1,000.00. The value of the stock on 11/11/44 was \$1,000.00.

2. The results of the study show that the value of the stock was \$1,000.00. The value of the stock on 11/11/44 was \$1,000.00. The value of the stock on 11/11/44 was \$1,000.00.

3. The results of the study show that the value of the stock was \$1,000.00. The value of the stock on 11/11/44 was \$1,000.00. The value of the stock on 11/11/44 was \$1,000.00.

4. The results of the study show that the value of the stock was \$1,000.00. The value of the stock on 11/11/44 was \$1,000.00. The value of the stock on 11/11/44 was \$1,000.00.

to complete stream type Ribes eradication on the Clearwater Timber Protective Association. Every effort should be made to complete that type of protection as soon as possible.

2. It is very difficult to locate camps in the back country during the early part of the season because of the generally impassable condition of side roads in the Clearwater district. If camps were started in the spring where they could be reached by truck and moved to the back country later in the year, considerable trouble in starting all camps could be avoided.

3. A closer check on camps could be made (which would greatly aid the supervisor of the eradication work) if telephones were placed in each camp. On the Clearwater Timber Protective Association district it would seldom be necessary to lay more than two miles of emergency wire to tie into Association lines. Telephones in the camps would also help the Association fire warden in securing aid in cases of emergency.

4. A small cache of fire tools in each camp would also be a step forward in placing blister rust camps in a position to aid the fire warden.

PRELIMINARY RIBES ERADICATION SURVEY ON THE CLEARWATER TIMBER PROTECTIVE ASSOCIATION

After the eradication camps were closed in the fall four men spent a week making a preliminary survey of areas which will probably be worked during the 1921 field season.

In making this survey particular attention was given to the accessibility of the area, species, concentrations and distribution of Ribes and various factors which might influence the difficulty of eradicating the Ribes from the area. Possible camp sites were picked out and the various drainages divided into probable unit areas.

A considerable amount of information regarding the creeks about Pierce was obtained directly from the scouting organization.

The essential facts gained by the preliminary survey are shown in Table No. 5.

to complete the work from the Clearwater timber
type of protection as soon as possible.

It is very difficult to locate camps in the same manner as
the early part of the season because of the generally light
color of the trees in the Clearwater district. It was with
in the spring when they could be located by color and moved to the
back country later in the year, considerable trouble in starting all
camps would be avoided.

A closer study of the work would be indicated as it is
the majority of the workmen (and) it is necessary to place in
them. On the Clearwater timber protection, the workmen
could either be necessary to have some two miles of protection
to the timber protection line. The workmen in the same work
the protection line would be necessary and in some of the work.

A small number of the workmen is well equipped with a
forest in the same manner as a forest in the same
manner. It is necessary to have some two miles of protection
to the timber protection line. The workmen in the same work
the protection line would be necessary and in some of the work.

REMARKS ON THE WORK OF THE CLEARWATER TIMBER LINE

It is very difficult to locate camps in the same manner as
the early part of the season because of the generally light
color of the trees in the Clearwater district. It was with
in the spring when they could be located by color and moved to the
back country later in the year, considerable trouble in starting all
camps would be avoided.

A closer study of the work would be indicated as it is
the majority of the workmen (and) it is necessary to place in
them. On the Clearwater timber protection, the workmen
could either be necessary to have some two miles of protection
to the timber protection line. The workmen in the same work
the protection line would be necessary and in some of the work.

A small number of the workmen is well equipped with a
forest in the same manner as a forest in the same
manner. It is necessary to have some two miles of protection
to the timber protection line. The workmen in the same work
the protection line would be necessary and in some of the work.

TABLE NO. 5

PRELIMINARY STREAM TYPE ERADICATION SURVEY

| Drainage | Time Needed
To Work
Area with
20-Man Unit | Amount of
Chemical Needed
on Basis of 1.4#
Atlacide to 1
Gal. of Spray | Estimated
Cost to
Work Stream
Type |
|----------------------------|--|--|---|
| Silver Creek | 6 months | 7 1/2 tons | \$ 17,000.00 |
| Elkberry Creek | 2 months | 1 ton | \$ 6,000.00 |
| Shanghai Creek | 1 month | 1 1/2 tons | \$ 2,800.00 |
| Quartz Creek | 1 1/2 months | 1 1/2 tons | \$ 3,500.00 |
| Trail and
Beaver Creeks | 1 month | 1 ton | \$ 2,700.00 |

Information regarding Ribes conditions on Canal Gulch and Rhodes creeks was secured also but more data will be necessary before cost estimates can be made for those units.

100

[illegible]

Information regarding Ribera conditions on Santa Fe and
other areas was received from the Santa Fe office.
and was forwarded to the Santa Fe office.



W.410 - Ribes petiolare being sprayed by crewman on the Potlatch Timber Protective Association.



W.429 - Ribes petiolare that was sprayed about fifteen days prior to taking of picture on the Potlatch Timber Protective Association.

COOPERATIVE LOCAL CONTROL

POTLATCH TIMBER PROTECTIVE ASSOCIATION

were explained in detail in the preliminary notes of the eradication work. W. G. Guernsey
Junior Forester
tion was increased in size from the four camps.

INTRODUCTION

The eradication of wild currants and gooseberries in stream type was continued during the 1930 season on the Potlatch Timber Protective Association. Large areas were encountered which had few Ribes. Rapid progress was made on these areas by the smaller sized camps which were easily transported by pack string. In fact, the great distance supplies and equipment were packed at a minimum of expense from the central warehouse at Elk River aids in encouraging the local control program in the more inaccessible white pine areas.

The continuance of Ribes eradication in the stream type of the Potlatch Timber Protective Association on the present financial basis points to the completion of first working by 1932.

PURPOSE OF WORK

The purposes of the 1930 work in the practical eradication of the hosts of white pine blister rust on the Potlatch Timber Protective Association were:

1. To continue complete eradication of all Ribes in the stream type of white pine areas.
2. To continue the application of the control program on private and state lands and to develop a personnel for future work.

LOCATION AND DESCRIPTION OF THE AREAS

The areas worked in the 1930 season are shown on the Potlatch Timber Protective Association's eradication working unit map. The working units completed are as follows: 5, 6, 7, 8, 9, 10, 13, 14, 15, 16, 20, 21 and 24 with a total area partially protected of 147,443 acres. The units protected in part are the eastern portions of 17, 18 and 19 with a total acreage of 14,560. The north part of unit 4 and the lower portion of unit 22 were worked to the extent of 5,500 acres, embracing Partridge Creek and the territory three-quarters of a mile north of Elk River, Idaho, on Elk Creek. The total area partially protected on the Association lands for 1930, comprising all units amounts to 155,000 acres. All the units on which work was performed during the season were characterized by having a large percentage of white pine of all age classes present.

COOPERATIVE LOCAL COUNCIL
COOPERATIVE TIMBER PROTECTIVE ASSOCIATION

by
W. G. Gurnsey
Junior Forester

INTRODUCTION

The introduction of this service and knowledge in this type was obtained during the 1930 season on the White Pine River. Large areas were investigated which had the same kind of growth as those areas by the smaller areas which were easily investigated by back sight. In fact, the great distance and equipment were needed at a distance of several miles from the central watershed at the river side in conducting the local control program in the more inaccessible white areas.

The continuance of this investigation in the future type of the White Pine River Association on the present financial basis points to the completion of first working by 1935.

THE WHITE PINE RIVER

The purpose of the 1930 work in the practical investigation of the White Pine River was on the White Pine River Association work:

1. To continue complete investigation of all types in the stream of white pine areas.
2. To continue the application of the control program on private lands and to develop a permanent for future work.

LOCATION AND DESCRIPTION OF THE AREAS

The areas studied in the 1930 season are shown on the map. Timber Protective Association's investigation working unit was. The units completed are as follows: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100. The units are a total area partially protected of 167,443 acres. The units are located in part on the western portion of 17, 18 and 19 with a total coverage of 14,820. The north part of unit 4 and the lower portion of unit 11 were worked to the extent of 2,500 acres, including the White Pine and the Laramie three-quarters of a mile north of the river. The total area partially protected on the Association lands for 1930, comprising all units worked during the season were all the units on which work was performed during the season were characterized by having a large percentage of white pine of all the classes present.

METHODS, EQUIPMENT AND MATERIALS

The general methods, items of equipment and chemicals used were explained in detail in the introductory notes of the eradication report for 1929. Similar methods, items of equipment and chemicals were used during the 1930 season with practically no change. The operation was increased in size from two to four camps.

A one and one-half-ton capacity Chevrolet truck, purchased in the spring of 1930, was used to transport supplies and equipment.

A pack string, consisting of ten mules and a saddle horse, was hired to transport supplies and equipment to camps on areas far from roads.

Through the generosity of the officials of the Potlatch Timber Company at Elk River, Idaho, no charge was made for the warehouse used as headquarters for stabling the pack animals and storing supplies.

REPORT ON THE RESULTS OF THE SURVEY

The general methods, items of equipment and chemicals used were explained in detail in the preliminary report of the survey for 1935. During the survey, items of equipment and chemicals were used during the 1935 season with practically no change. The only item was introduced in 1935 was the use of a new type of...

A new and more efficient method of surveying was used in the spring of 1935, and used in the same manner as the previous method.

A new type of surveying was used in the spring of 1935, and used in the same manner as the previous method.

There was a change in the method of surveying in the spring of 1935, and used in the same manner as the previous method.

The conditions of the survey in the spring of 1935 were similar to the conditions of the survey in the spring of 1934.

The results of the survey in the spring of 1935 were similar to the results of the survey in the spring of 1934.

The results of the survey in the spring of 1935 were similar to the results of the survey in the spring of 1934.

The results of the survey in the spring of 1935 were similar to the results of the survey in the spring of 1934.

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The results of the survey in the spring of 1935 were similar to the results of the survey in the spring of 1934.

The results of the survey in the spring of 1935 were similar to the results of the survey in the spring of 1934.

WORK PERFORMED AND RESULTS OBTAINED

TABLE NO. 1

SUMMARY OF RESULTS OF RIBES ERADICATION IN SPRING TYPE BY HAND FOLLIES METHODS ON THE POTLATCH FISHING PROTECTIVE ASSOCIATION LANDS

| Work-
ing
Unit | Number Ribes Killed | | | | | Man Days | | Acres | Ribes
per
Acres |
|----------------------|---------------------|-----------------|--------------|------------|--------------|-----------|-------|---------|-----------------------|
| | R.
Op. | R.
laqueatre | R.
visco. | R.
pet. | R.
inorme | Total | Men | Women | |
| 5 | 79,932 | 213 | 1,703 | - | - | 81,848 | 145 | 75 | 512.4 |
| 6 | 12,915 | 24 | 192 | - | - | 13,131 | 33 | 18 | 145.1 |
| 7-8 | 31,575 | 2,672 | 4,250 | - | - | 38,497 | 72 | 39 | 577.1 |
| 9 | 243 | 346 | - | - | - | 589 | 12 | 17 | 74.5 |
| 10 | 283,342 | 24,578 | 7,554 | 28,445 | - | 343,919 | 645 | 326 | 1,721.7 |
| 13 | 112,345 | 1,010 | 3,152 | - | - | 116,507 | 150 | 80 | 407.0 |
| 15 | 154,400 | 213 | 110,276 | - | - | 264,889 | 35 | 100 | 801.2 |
| 16 | 4,988 | 3,155 | 9,534 | - | - | 17,677 | 70 | 48 | 403.5 |
| 17 | 2,760 | 167 | 1,902 | - | - | 4,829 | 33 | 11.5 | 74.6 |
| 18 | 29,592 | 133 | 21,788 | - | - | 51,513 | 115 | 52 | 155.3 |
| 19 | 40,957 | 2,752 | 16,108 | - | - | 59,817 | 151 | 76 | 359.7 |
| 20 | 38,100 | 171 | 31,246 | - | - | 69,517 | 152 | 71 | 335.7 |
| 21 | 104,492 | 1,201 | 42,793 | - | - | 148,486 | 209 | 90 | 417.0 |
| 22 | 79,571 | 17,569 | 8,572 | 12,520 | - | 118,152 | 217 | 91 | 443.7 |
| Total | 925,744 | 74,713 | 312,170 | 47,045 | - | 1,475,635 | 2,225 | 1,073.5 | 6,747.4 |

*Working units not completed.

of the various units. This is Table No. 2

TABLE NO. 2

SUMMARY OF RESULTS OF SPRAYING 1929 POTLATCH IN SPRING TYPE ON THE POTLATCH FISHING PROTECTIVE ASSOCIATION LANDS

| Prod.
Class | Working
Unit No. | Man-
Days | Acres | Gallons | Gallons
Per Acre |
|----------------|---------------------|--------------|-------|---------|---------------------|
| 1 | 7 | 78 | 96.2 | 1,703 | 17.7 |
| 1 | 10 | 18 | 14.0 | 291 | 20.7 |
| M | 10 | 359 | 308.7 | 8,158 | 26.1 |
| H | 10 | 123 | 42.9 | 3,253 | 74.0 |
| L | 22 | 19 | 54.0 | 352 | 15.0 |
| A | 22 | 185 | 97.5 | 4,125 | 42.9 |
| Total | | 772 | 464.3 | 17,850 | 37.0 |

REPORT OF THE COMMISSIONER OF THE GENERAL LAND OFFICE

TABLE NO. 1

STATE OF NEW YORK
COUNTY OF ALBANY
TOWN OF ALBANY
ASSOCIATION LANDS

| No. | Acres | Twp. 1 N. R. 1 E. | | Twp. 2 N. R. 2 E. | | | | Twp. 3 N. R. 3 E. | | Total |
|-----|-------|-------------------|---|-------------------|---|---|---|-------------------|---|-------|
| | | 1 | 2 | 1 | 2 | 3 | 4 | 1 | 2 | |
| 1 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 2 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 3 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 4 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 5 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 6 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 7 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 8 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 9 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 10 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 11 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 12 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 13 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 14 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 15 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 16 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 17 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 18 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 19 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 20 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 21 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 22 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 23 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 24 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 25 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 26 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 27 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 28 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 29 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 30 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 31 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 32 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 33 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 34 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 35 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 36 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 37 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 38 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 39 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 40 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 41 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 42 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 43 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 44 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 45 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 46 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 47 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 48 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 49 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 50 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 51 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 52 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 53 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 54 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 55 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 56 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 57 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 58 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 59 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 60 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 61 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 62 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 63 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 64 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 65 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 66 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 67 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 68 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 69 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 70 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 71 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 72 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 73 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 74 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 75 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 76 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 77 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 78 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 79 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 80 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 81 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 82 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 83 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 84 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 85 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 86 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 87 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 88 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 89 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 90 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 91 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 92 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 93 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 94 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 95 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 96 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 97 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 98 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 99 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |
| 100 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 100 |

A. General Statement and Analysis of Costs of Ribes eradication on the
Potlatch Timber Protective Association Lands.

TABLE NO. 3

COST OF OPERATION

| Item | | Cost | | | | |
|--------------------|-----------------|---------------|---------------|---------------|---------------|-------------|
| | | Camp
No. 1 | Camp
No. 2 | Camp
No. 3 | Camp
No. 4 | Total |
| | Supervisors | \$ 509.24 | \$ 509.24 | \$ 509.24 | \$ 509.24 | \$ 2,035.96 |
| Salaries | Temporary Men | 5,047.14 | 3,750.52 | 4,559.71 | 3,720.52 | 16,587.90 |
| | Cooks' salaries | 524.77 | 332.17 | 422.50 | 333.00 | 1,612.44 |
| Subsis-
tence | Cost of food | 1,409.55 | 684.52 | 1,165.07 | 1,089.02 | 4,348.16 |
| | Transp. of food | 343.07 | 263.07 | 343.07 | 343.07 | 1,292.28 |
| General | Cost | 130.01 | 130.01 | 130.01 | 130.01 | 520.04 |
| Equip. | Transportation | 152.35 | 152.35 | 152.35 | 152.35 | 609.40 |
| Praying | Equipment | 152.46 | 50.82 | | | 203.28 |
| | Supplies | 20.96 | 20.96 | 20.96 | 20.96 | 83.84 |
| | Expenses | 16.00 | 16.00 | 16.00 | 16.00 | 64.00 |
| Miscel-
laneous | Repairs | 10.00 | 10.00 | 10.00 | 10.00 | 40.00 |
| | Twine | 28.00 | 28.00 | 28.00 | 28.00 | 112.00 |
| | Cost | 1,400.00 | 364.00 | | | 1,764.00 |
| Chemical | Transportation | 61.92 | 20.64 | | | 82.56 |
| Total | | \$9,835.77 | \$5,862.73 | \$7,387.71 | \$6,425.78 | \$29,511.99 |

It will be noted that there is a rather wide range in total cost of the various units. This is accounted for by the fact that the units ranged in size from 17 to 25 men and that practically all the chemical was used in Camp 1.

B. Cost of eradicating Ribes from stream type by eradication working
Units.

The average cost is \$4.37 for the actual stream type acreage covered. The 165,000 acres partially protected by stream type eradication of Ribes was \$0.18 per acre.

TABLE NO. 4

COST OF PESTIGATION

| Working Unit No. | Hand Irradiation | | Chemical Irradiation | | Total Acreage | Total Cost | Cost Per Acre |
|------------------|------------------|-------------|----------------------|-------------|----------------|------------|---------------|
| | Acreage | Total Ribes | Ribes Per acre | Cals. spray | Cals. Per acre | | |
| 5 | 512.4 | 81,548 | 133 | | | 512.4 | 1,488.50 |
| 6 | 145.1 | 15,131 | 111 | | | 145.1 | 348.13 |
| 7-8 | 207.1 | 31,297 | 151 | 1,703 | 17.7 | 307.1 | 1,393.47 |
| 9 | 304.5 | 491 | 1.6 | | | 304.5 | 742.05 |
| 10 | 1,731.4 | 353,713 | 204 | 11,712 | 43.9 | 1,731.7 | 11,190.53 |
| 13 | 487.0 | 202,917 | 417 | | | 487.0 | 1,723.80 |
| 15 | 801.2 | 286,588 | 332 | | | 801.2 | 2,290.50 |
| 16 | 292.5 | 17,875 | 31 | | | 292.5 | 652.74 |
| 17 | 84.6 | 4,879 | 57 | | | 84.6 | 301.72 |
| 18 | 155.5 | 51,920 | 332 | | | 155.5 | 1,117.21 |
| 19 | 226.7 | 59,817 | 182 | | | 226.7 | 1,581.31 |
| 20 | 322.7 | 29,917 | 228 | | | 322.7 | 1,574.72 |
| 21 | 847.0 | 143,831 | 175 | | | 847.0 | 1,992.37 |
| 22 | 442.7 | 124,151 | 279 | 4,545 | 37.4 | 442.7 | 3,587.24 |
| Total | 5,747.4 | 1,428,535 | 211 | 17,960 | 37.0 | 5,747.4 | 511,461.47 |

*Working units not complete.

**The acreage sprayed had Ribes bushes other than *R. petiolare* hand pulled. Hence it is a part of the acreage listed under hand pulling and the two should not be added.

at the end of the year. The following table shows the results of the work done during the year. The figures are given in pounds and ounces. The total weight of the material used is 100 lb. The total weight of the material produced is 100 lb. The difference between the two is 0 lb. Hence the

| Year | Material used | Material produced | Material lost | Material gained | Material balance |
|------|---------------|-------------------|---------------|-----------------|------------------|
| 1900 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1901 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1902 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1903 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1904 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1905 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1906 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1907 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1908 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1909 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1910 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1911 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1912 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1913 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1914 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1915 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1916 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1917 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1918 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1919 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1920 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1921 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1922 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1923 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1924 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1925 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1926 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1927 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1928 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1929 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1930 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1931 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1932 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1933 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1934 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1935 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1936 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1937 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1938 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1939 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1940 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1941 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1942 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1943 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1944 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1945 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1946 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1947 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1948 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1949 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1950 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1951 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1952 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1953 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1954 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1955 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1956 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1957 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1958 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1959 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1960 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1961 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1962 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1963 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1964 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1965 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1966 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1967 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1968 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1969 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1970 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1971 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1972 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1973 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1974 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1975 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1976 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1977 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1978 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1979 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1980 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1981 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1982 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1983 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1984 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1985 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1986 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1987 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1988 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1989 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1990 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1991 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1992 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1993 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1994 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1995 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1996 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1997 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1998 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 1999 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |
| 2000 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 |

of the work done during the year. The figures are given in pounds and ounces. The total weight of the material used is 100 lb. The total weight of the material produced is 100 lb. The difference between the two is 0 lb. Hence the

C. Cost of Meals Served in the Eradication Camps.

TABLE NO. 5

COST OF MEALS

| Camp No. | Cooks' Salary | Cost of Food | Transp. of Food | Total Subs. Cost | Number of Meals | Ave. Cost Per Meal |
|----------|---------------|--------------|-----------------|------------------|-----------------|--------------------|
| 1 | \$ 524.77 | \$1,409.55 | \$ 343.07 | \$2,277.39 | 7,234 | .31 |
| 2 | 332.77 | 684.52 | 263.07 | 1,280.46 | 2,950 | .42 |
| 3 | 422.30 | 1,165.07 | 343.07 | 1,930.44 | 4,800 | .40 |
| 4 | 355.00 | 1,089.02 | 343.07 | 1,795.09 | 4,570 | .39 |
| Total | \$1,646.04 | \$4,348.26 | \$1,292.28 | \$7,286.58 | 19,554 | .37 |

Camp 1's average low meal cost was due in part to the large number of employees at that camp.

It was deemed advisable, due to the increased cost of meals in the last few years, to pay careful attention to this point during the 1930 season. A careful check was made of all expenditures as to food stuffs used, transportation, cooking costs and number of meals, with gratifying results. The meal cost has decreased below former seasons with no appreciable change in meal quality..

D. Checking.

The system employed in former years of checking the areas worked by eradication crews has been changed slightly. At present the camp supervisors and crew foremen are responsible for satisfactory work being performed by crews under their supervision. These men go over the work before moving on to the next camp site to see if it is necessary to rework any areas and check with the idea in mind of ascertaining the thoroughness of a once-over eradication job.

In the future the personnel of the project, "Effectiveness of Control," will make a survey of the areas worked in 1930 and make a report on the effectiveness of work performed by the eradication forces.

CONCLUSION

Ribes are rapidly being eradicated from stream type on the Pottlatch Timber Protective Association. It is not improbable under favorable working conditions that local control in stream type will be completed within the next two years on this Association. The rapid progress was due partially to large areas having few Ribes in stream type and to the supervisor's knowledge of Ribes conditions through information obtained by a preliminary eradication survey.

100

| Year | Month | Day | Time | Cost | Value | Gain |
|------|-------|-----|-------|-------|-------|------|
| 1902 | Jan | 1 | 10:00 | 10.00 | 10.00 | 0.00 |
| 1902 | Jan | 2 | 10:00 | 10.00 | 10.00 | 0.00 |
| 1902 | Jan | 3 | 10:00 | 10.00 | 10.00 | 0.00 |
| 1902 | Jan | 4 | 10:00 | 10.00 | 10.00 | 0.00 |
| 1902 | Jan | 5 | 10:00 | 10.00 | 10.00 | 0.00 |
| 1902 | Jan | 6 | 10:00 | 10.00 | 10.00 | 0.00 |
| 1902 | Jan | 7 | 10:00 | 10.00 | 10.00 | 0.00 |
| 1902 | Jan | 8 | 10:00 | 10.00 | 10.00 | 0.00 |
| 1902 | Jan | 9 | 10:00 | 10.00 | 10.00 | 0.00 |
| 1902 | Jan | 10 | 10:00 | 10.00 | 10.00 | 0.00 |

James I. Smith, Jr. and his family were the first to settle in the area of the present-day town of Nauvoo, Illinois, in 1839. They were the first of many pioneers who came to the area in search of a new home.

11. The above information was obtained from the files of the Department of the Interior, Bureau of Land Management, and is being furnished to you for your information. It is not to be used for any other purpose without the express written consent of the Bureau of Land Management.

• 25128 •

The given analysis of the text is a very good example of the work of the author. The analysis is very thorough and covers all the important points of the text. The author has done a very good job of summarizing the text and making it easy to understand. The analysis is very well written and is a very good example of the work of the author.

In the future the personnel of the project, under the direction of the project manager, will be responsible for the development of the project and the management of the project. The project manager will be responsible for the overall management of the project and the coordination of the project team. The project manager will also be responsible for the development of the project and the management of the project. The project manager will also be responsible for the development of the project and the management of the project.

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[illegible]

RECOMMENDATIONS

1. The continued use of the extended budget system of funds to be expended during any year, or portion of a year. This system has proven invaluable while in the field, with the cooperation of the fiscal department in forwarding copies of all vouchers not written in the field to the project supervisor,

2. The reworking of all chemically sprayed areas after the mopping up work is completed should be undertaken along with a program of complete eradication of Ribes on the hillsides.

3. Camp equipment should be standardized for the various sized camps.

The purpose of scouting is to determine the extent and location of the disease. A secondary objective is the development of a Ribes distribution map for this region.

LOCATIONS OF WORK

The most intensive work done was on lands of the State, Pettit and Clearwater Timber Protective Associations and on the Clearwater National Forests. Other areas on which work was done were the Clearwater National Forest, and the Clearwater National Forest.

SCOUTING

A. Spring Scouting

Because of the large infection in the Clearwater National Forest it is believed that other nearby areas are also infected. In an effort to locate pine infection in the Clearwater National Forest, Mt. Spokane two members of the project went to the Clearwater National Forest in April. No infection was located.

B. Summer and Fall Scouting

In September, scouting was continued on the Clearwater National Forest and the effectiveness of the chemical treatment. In addition, scouting was done on other areas of the Clearwater National Forest.

2. Management of the project During the summer, scouting was done on the mountain while establishing, and checking, the various traps and doing disease surveys of the large areas of the forest on the mountain.

ADMINISTRATION

1. The continued use of the attached budget system of funds to be expended during the year, or period of a year. This system has proved invaluable while in the field, and the cooperation of the fiscal department in insuring the success of all operations was written in the field to the project manager.

2. The transfer of all financial records from the previous year to the new year is completed and the records are now in the hands of the project manager.

3. Camp equipment should be standardized for the various camps.

4. The records of the project should be kept in the hands of the project manager.

5. The records of the project should be kept in the hands of the project manager.

6. The records of the project should be kept in the hands of the project manager.

7. The records of the project should be kept in the hands of the project manager.

8. The records of the project should be kept in the hands of the project manager.

9. The records of the project should be kept in the hands of the project manager.

10. The records of the project should be kept in the hands of the project manager.

11. The records of the project should be kept in the hands of the project manager.

12. The records of the project should be kept in the hands of the project manager.

SCOUTING FOR BLISTER RUST IN NORTHERN IDAHO, 1930

By

E. I. Joy

Junior Forester

INTRODUCTION

From 1927 to 1929 a study of the locations of blister rust infections in north Idaho showed that the disease was spread over the entire white pine region of the state. It was further determined that the greatest amount of infection was in the southern part of this area where Ribes petiolare occurs in greatest abundance. Scouting in 1930 was confined mainly to the southern one-third and the extreme northern portion of the region.

PURPOSE

The purpose of scouting is to determine the extent and intensity of the disease. A secondary objective is the development of a stream type Ribes distribution map for this region.

LOCATION OF WORK

The most intensive work done was on lands of the Priest Lake, Potlatch and Clearwater Timber Protective Associations and the Kaniksu and Clearwater National Forests. Other areas on which some work was done were the Coeur d'Alene Timber Protective Association and the St Joe National Forest.

ORGANIZATION

A. Spring Scouting

Because of the large infection center at Newman Lake, Washington it is believed that other centers exist within a few miles of this area. In an effort to locate pine infection in the vicinity of Mica Peak and Mt. Spokane two members of the permanent personnel scouted in these areas in April. No infection was located.

B. Summer and Fall Scouting

1. Personnel. Scouting was carried on in conjunction with "Infection Surveys" and "Effectiveness of Control Studies". In addition, scouting was done by members of other projects whenever they had the opportunity.

2. Division of time. During the summer, scouting was done by the men while establishing and checking the stream type study plots and making disease surveys of the large areas of infection on the Potlatch, Clearwater

and Coeur d'Alene Associations. In the fall, scouting crews were organized for intensive work on the Keniksu, St. Joe and Clearwater National Forests and the Priest Lake and Clearwater Associations.

3. Methods of work. The work was confined to the stream type where Ribes and pines are usually found in good association. More attention was given to pine scouting in an effort to locate as many centers of pine infection as possible, these being of considerable importance in the organization of the control program.

4. Data. Data were taken on the association of hosts, abundance of each, the number examined and infected and the quantity of infection when found. Distribution of the pines, the Ribes by species and location of infections found were shown on a rough sketch map of the drainage.

RESULTS OF SCOUTING

A. General Summary

The results of scouting done during 1930 have been summarized and appear in Table No. 1. Table No. 2 gives a detailed account of infections found in 1930 while Table No. 3 is a summary of all pine infections found in Idaho to date.

| County | Number of
Pine Trees
Examined | Number of
Pine Trees
Infected | Number of
Ribes
Examined | Number of
Ribes
Infected | Number of
Infections
Found |
|------------|-------------------------------------|-------------------------------------|--------------------------------|--------------------------------|----------------------------------|
| Boundary | 4 | 0 | 0 | 0 | 0 |
| Blaine | 12 | 0 | 0 | 0 | 0 |
| Boise | 1 | 0 | 0 | 0 | 0 |
| Butte | 12 | 12 | 15 | 17 | 25 |
| Clearwater | 10 | 10 | 10 | 10 | 10 |
| Totals | 39 | 12 | 35 | 27 | 35 |

and Cochrane 1941 in the latter. In the latter, according to the original
for intensive work on the subject. The two are identical.

5. Methods of work. The work was carried out in the form of a series of interviews with the subjects. The subjects were interviewed in their own homes. The interviews were conducted in the form of a series of questions and answers. The subjects were asked to describe their own work and to explain the reasons for their work. The subjects were also asked to describe the work of other people in their organization. The subjects were asked to describe the work of other people in their organization. The subjects were asked to describe the work of other people in their organization.

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A. General Summary: The results of scouting done during 1930 were as follows: 1. There was a general increase in the number of all the birds found in Idaho to date.

TABLE NO. 1

SUMMARY OF SCOUTING IN SOUTHERN IDAHO, 1930

| County | Number
Inspection
Points | Number
Infec-
tion
Points | Ribes | | | | | | | | | | | | | | Totals | | Pines | |
|------------|--------------------------------|------------------------------------|--------------|------|-----------|------|-----------|------|-------------|------|------------|------|-------------|------|--------|------|--------|------|-------|------|
| | | | R. petiolare | | R. triste | | R. inerme | | R. irriguum | | R. viscos. | | R. lacustre | | Total | | | | | |
| | | | Exam. | Inf. | Exam. | Inf. | Exam. | Inf. | Exam. | Inf. | Exam. | Inf. | Exam. | Inf. | Exam. | Inf. | Exam. | Inf. | Exam. | Inf. |
| Boundary | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 870 | 0 | 870 | 0 | 355 | 0 |
| Bonner | 13 | 0 | 0 | 0 | 0 | 0 | 2,350 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,300 | 0 | 3,650 | 0 | 2,000 | 0 |
| Kootenai | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 500 | 0 |
| Shoshone | 16 | 12 | 7,115 | 17 | 250 | 5 | 285 | 0 | 170 | 0 | 450 | 0 | 196 | 0 | 8,467 | 22 | 1,564 | 101 | | |
| Clearwater | 37 | 12 | 13,223 | 22 | 0 | 0 | 335 | 0 | 0 | 0 | 15 | 0 | 271 | 1 | 13,844 | 23 | 8,250 | 134 | | |
| Totals | 73 | 30 | 20,539 | 39 | 200 | 5 | 2,970 | 0 | 170 | 0 | 465 | 0 | 2,637 | 1 | 26,631 | 45 | 12,674 | 236 | | |

TABLE NO. 2

SUMMARY OF INFECTIONS FOUND IN NORTHERN IDAHO, 1930

| County | Location | Species | Ribes | | | Pines | | |
|------------|--|-----------------------|----------|---------------|---|----------|---------------|---|
| | | | Examined | In-
fected | Per Cent
Leaves
Infected
Per
Infected
Bush | Examined | In-
fected | Year
of
Origin
of In-
fection |
| Shoshone | Merry Creek above junction of East Fork and North Fork near Clarkia, Coeur d'Alene Timber Protective Association, township 43 north, range 2 east, section 33 | R. petiolare | 3,000 | 50 | 7 | | | |
| | | R. triste | 250 | 5 | 7 | | | |
| | | R. inerme | 250 | 0 | | | | |
| | | R. viscosissimum | 25 | 0 | | | | |
| | | R. lacustre | 100 | 0 | | | | |
| | Mouth of Lucky Swede Creek on North Fork of St. Joe River, St. Joe National Forest, township 46 north, range 6 east, section 6 | R. petiolare | 700 | 1 | 10 | 1,000 | 100 | 1927 |
| | | R. inerme | 10 | 0 | | | | |
| | | R. lacustre | 10 | 0 | | 30 | 0 | |
| | Loop Creek, tributary to Little North Fork St. Joe River 4½ miles from mouth, township 46 north, range 6 east, section 11 | R. petiolare | 700 | 1 | 10 | | | |
| | | R. lacustre | 10 | 0 | | 30 | 0 | |
| | | R. petiolare | 700 | 1 | 50 | | | |
| | | R. inerme | 10 | 0 | | | | |
| | | R. lacustre | 10 | 0 | | 30 | 0 | |
| | Loop Creek at mouth of Clear Creek, township 46 north, range 6 east, section 11 | R. petiolare | 600 | 1 | 10 | | | |
| | | R. lacustre | 10 | 0 | | 30 | 0 | |
| | Loop Creek at junction of two forks Allen and Ward creeks, township 46 north, range 7 east, section 20 | R. petiolare | 600 | 1 | 10 | | | |
| | | R. inerme | 10 | 0 | | | | |
| | | R. lacustre | 10 | 0 | | 30 | 0 | |
| | Loop Creek 5 miles from mouth, township 46 north, range 6 east, section 11 | R. petiolare | 700 | 1 | 20 | | | |
| | | R. lacustre | 10 | 0 | | 30 | 0 | |
| | Tributary Bullion Creek, 5.4 miles from highway on road to Avery, township 47 north, range 6 east, northwest quarter section 28 | R. petiolare | 40 | 2 | 15 | | | |
| | | R. viscosissimum | 40 | 0 | | | | |
| | | R. lacustre | 10 | 0 | | 15 | 0 | |
| | Bullion Creek 16 miles north of Avery at crossing near County Cabin, township 47 north, range 6 east, section 29 | R. petiolare | 8 | 1 | 50 | | | |
| | | R. viscosissimum | 2 | 0 | | 15 | 0 | |
| | Hammond Creek 6 miles northeast of Avery near road crossing, township 46 north, range 5 east, sections 25 and 26 | R. petiolare | 36 | 6 | 40 | | | |
| | | R. viscosissimum | 8 | 0 | | | | |
| | | R. lacustre | 4 | 0 | | 100 | 1 | 1927 |
| | Kyle Creek 7.5 miles north of Avery at road crossing, township 46 north, range 5 east, section 24 | R. petiolare | | | | | | |
| | | R. petiolare | 6 | 1 | 5 | 5 | 0 | |
| | Nine miles north of Avery on road along Little North Fork St. Joe River, township 46 north, range 6 east, section 7 | R. petiolare | 1 | 1 | 75 | 4 | 0 | |
| Clearwater | Beaver Creek one mile from mouth in Clearwater National Forest, township 40 north, range 7 east, section 7 | R. petiolare | 20 | 2 | 100 | 10 | 4 | 1927 |
| | Beaver Creek 1/2 mile above Clearwater Timber Company, Camp 1, Clearwater Timber Protective Association, township 40 north, range 6 east, section 28 | R. petiolare | 500 | 4 | 70 | 200 | 0 | |
| | Beaver Creek 5 miles above Clearwater Timber Company, Camp 1, Clearwater Timber Protective Association, township 40 north, range 6 east, section 34 | R. petiolare | 4,000 | 2 | 50 | 300 | 0 | |
| | Beaver Creek 1/4 to 3/4 mile above Clearwater Timber Company, Camp 9, Clearwater Timber Protective Association, township 39 north, range 5 east, section 12 | R. petiolare | 3,000 | 3 | 10 | 50 | 0 | |
| | North Fork Reed's Creek 1/2 mile below Headquarters, Clearwater Timber Protective Association, township 38 north, range 5 east, section 15 | R. petiolare | 25 | 0 | | 50 | 7 | 1927 |
| | North Fork Reed's Creek 1½ miles below Headquarters, Clearwater Timber Protective Association, township 38 north, range 5 east, section 15. (Pine infection found in 1929. All infected trees found were cut.) | R. petiolare | 7 | 2 | 100 | | | |
| | | R. lacustre | 1 | 1 | 100 | | | |
| | | Ribes eradicated 1929 | | | | 20 | 3 | 1927 |
| | Little Beaver Creek above Clearwater Timber Company, Camp 3, Clearwater Timber Protective Association, township 37 north, range 5 east, section 10 | R. petiolare | 500 | 2 | 4 | 30 | 0 | |
| | Trail Creek above Clearwater Timber Company, Camp 3, Clearwater Timber Protective Association, township 37 north, range 5 east, section 11 | R. petiolare | 500 | 3 | 25 | 200 | 0 | |
| | Quartz Creek 3/10 mile above mouth, Clearwater Timber Protective Association, township 37 north, range 5 east, section 34 | R. petiolare | 25 | 1 | 20 | 50 | 0 | |
| | Quartz Creek at Clearwater Timber Company, Camp 12, Clearwater Timber Protective Association, township 37 north, range 5 east, section 35 | R. petiolare | | | | 350 | 26 | 1927 |
| | Rhodes Creek 1/4 mile above old dredge, Clearwater Timber Protective Association, township 37 north, range 5 east, section 36 | R. petiolare | 10 | 1 | 0 | | | |
| | | R. lacustre | 100 | 0 | | 500 | 62 | 1923 |
| | | R. petiolare | 500 | 0 | | | | |
| | | R. viscosissimum | 15 | 0 | | | | |
| | | R. inerme | 25 | 0 | | | | |
| | | R. lacustre | 25 | 0 | | 300 | 13 | 1927 |
| | Orofino Creek 6 chains below old dredge, Clearwater Timber Protective Association, township 36 north, range 5 east, section 13 | R. petiolare | 1,300 | 1 | 0.1 | | | |
| | Oro Grande Creek 8 miles from Bungalow Ranger Station, Clearwater National Forest, township 38 north, range 7 east, section 35 | R. inerme | 300 | 0 | | 150 | 0 | |
| | | R. lacustre | 500 | 0 | | | | |
| | Johnson Creek, branch of Cameron Creek 1½ to 2 miles above mouth, near Elk River, Potlatch Timber Protective Association, township 40 north, range 2 east, section 19 | Ribes eradicated | | | | 250 | 9 | 1927 |
| | Shattuck Creek, branch of Cameron Creek, 1½ miles from mouth, Potlatch Timber Protective Association, township 40 north, range 2 east, section 28 | Ribes eradicated | | | | 200 | 1 | 1927 |
| | Cameron Creek 7.4 miles from Elk River along highway, Potlatch Timber Protective Association, township 40 north, range 2 east, section 31 | Ribes eradicated | | | | 75 | 5 | 1927 |
| | Cameron Creek at forks 5.4 miles from Elk River, Potlatch Timber Protective Association, township 40 north, range 1 east, section 25 | Ribes eradicated | | | | 20 | 4 | 1927 |
| | East Fork Potlatch Creek near 1926 chemical eradication camp, Potlatch Timber Protective Association, township 41 north, range 2 east, section 30 | R. petiolare | 10 | 1 | 100 | | | |
| | | R. lacustre | 10 | 1 | 2 | 20 | 0 | |

Annual Report 1930

E. L. Joy

TABLE NO. 3

SUMMARY OF FIRE INSPECTIONS IN IDAHO, 1930

| County | Location | Year Located | Probable Year of Origin |
|------------|---|--------------|-------------------------|
| Clearwater | Elk Creek - Deep Creek, near Elk River, P.T.P.A., T. 39 N., R. 2 E., Sec. 14 | 1929 | *1923 |
| | Long Meadow Creek near Elk River P.T. P.A., T. 39 N., R. 1 E., Sec. 14 | 1929 | *1923 |
| | Johnson Creek near Elk River, P.T.P.A., T. 40 N., R. 2 E., Sec. 19 | 1930 | 1927 |
| | Shattuck Creek near Elk River, P.T.P.A., T. 40 N., R. 2 E., Sec. 28 | 1930 | 1927 |
| | Cameron Creek 7.4 miles from Elk River, P.T.P.A., T. 40 N., R. 2 E., Sec. 31 | 1930 | 1927 |
| | Cameron Creek 8.4 miles from Elk River, P.T.P.A., T. 40 N., R. 1 E., Sec. 25 | 1930 | 1927 |
| | North Fork of Reed's Creek 1 1/2 miles below Headquarters, C.T.P.A., T. 38 N., R. 5 E., Sec. 16 | 1929 | 1927 |
| | North Fork Reed's Creek 1/2 mile below Headquarters, C.T.P.A., T. 38 N., R. 5 E., Sec. 15 | 1930 | 1927 |
| | Quartz Creek at Clearwater Timber Co., Camp 12, C.T.P.A., T. 37 N., R. 5 E., Sec. 5 | 1930 | 1927 |
| | Rhodes Creek near Pierce, C.T.P.A., T. 37 N., R. 5 E., Sec. 36 | 1930 | *1923 |
| | Grofino Creek near Pierce, C.T.P.A., T. 36 N., R. 5 E., Sec. 13 | 1930 | 1928 |
| | Beaver Creek, 1 mile from mouth, Clearwater National Forest, T. 40 N., R. 7 E., Sec. 7 | 1930 | 1927 |
| Shoshone | Hammond Creek 6 miles northeast of Avery, St. Joe National Forest, T. 46 N., R. 5 E., Sec. 25, 26 | 1930 | 1927 |
| | Middle Fork St. Maries River near Clarkia, Occur d'Alene T.P.A., T. 42 N., R. 2 E., Sec. 5, 8-12 | 1929 | *1923 |
| | Merry Creek near Clarkia, T. 43 N., R. 2 E., Sec. 33 | 1930 | 1927 |

*Oldest known infections in Idaho.

TABLE NO. 2

SUMMARY OF FINE INFECTIONS IN IDAHO, 1930

| County | Location | Year of
Locality | Year of
Infection |
|----------|---|---------------------|----------------------|
| Clematis | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| Teton | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |
| | North Fork of Snake River, T. 40 N., R. 7 E., Sec. 15 | 1927 | 1927 |

*Oldest known infections in Idaho.

B. Details of Pine Infection Centers

Eleven new pine infection centers were found in 1930.
A detailed report of each follows:

1. Name - Johnson Creek infection.

Location - Near Elk River, Idaho 1½ to 2 miles above junction with Cameron Creek.

Inspectors - E. Joy, R. Myers, C. Chapman - June 27, 1930.

Pine inspection - Abundant pine reproduction 1 to 20 years old is growing on logged land. 250 trees were examined, 9 of which were found infected with a total of 16 cankers. The 4 oldest cankers were fruiting for the first time indicating the center to be of 1927 origin. All cankers located were destroyed.

Ribes inspection - The Ribes were eradicated from this area in 1930. R. petiolare and R. inerme were quite abundant before eradication.

Remarks: This center is probably the result of the spread of ascospores from the Long Meadow Creek infection which is about 5 miles distant. Location - 8.5 miles from Elk River and Cameron Creek.

2. Name - Shattuck Creek infection.

Location - Near Elk River, Idaho, 1½ miles above junction with Cameron Creek.

Inspectors - E. Joy, C. Chapman, August 31, 1930.

Pine inspection - Scattered pine reproduction 1 to 20 years old is growing on logged land. Of a total of 200 trees examined only one was found infected. This tree had on it one canker which probably started in 1927. This canker was destroyed.

Ribes inspection - The Ribes were eradicated from this area in 1930. R. petiolare and R. inerme were abundant at that time.

Remarks: Although an intensive search was made only one canker could be found. As this point is approximately 6 miles airline from the Long Meadow Creek infection, it is probable that the latter is the source of the infecting spores.

1. Name - Johnson Creek infection.

Location - near the river, about 1/2 mile above town.
Date of discovery - June 27, 1930.

2. Name - Johnson Creek infection.

Location - near the river, about 1/2 mile above town.
Date of discovery - June 27, 1930.

3. Name - Johnson Creek infection.

Location - near the river, about 1/2 mile above town.
Date of discovery - June 27, 1930.

Location - near the river, about 1/2 mile above town.
Date of discovery - June 27, 1930.

Location - near the river, about 1/2 mile above town.
Date of discovery - June 27, 1930.

4. Name - Johnson Creek infection.

Location - near the river, about 1/2 mile above town.
Date of discovery - June 27, 1930.

5. Name - Johnson Creek infection.

Location - near the river, about 1/2 mile above town.
Date of discovery - June 27, 1930.

Location - near the river, about 1/2 mile above town.
Date of discovery - June 27, 1930.

Location - near the river, about 1/2 mile above town.
Date of discovery - June 27, 1930.

3. Name - Cameron Creek infection (lower).

Location - 7.4 miles from Elia River along the highway.

Inspectors - C. Chapman, E. Joy, R. Myers, I. Nelson, June 21 and August 20, 1930.

Pine inspection - The stream and meadow type is wide at this point and supports only scattered white pine 1 to 40 years old. Excellent stands occur on either slope. 75 trees were examined in this vicinity. A total of 8 cankers were found on the 8 infected trees located. This center is probably of 1927 origin.

Ribes inspection - The Ribes were eradicated from this drainage in 1930. R. petiolare was the most abundant species.

Remarks: The Long Meadow Creek infection which is only 4 miles from this point is probably the source of the spores causing this center. The cankers located indicate that 1927 was the year this center started. All cankers found were destroyed.

4. Name - Cameron Creek infection (upper).

Location - 8.4 miles from Elia River along highway at forks of creek.

Inspectors - C. Chapman, E. Joy, R. Myers, June 23, 27, 1930.

Pine inspection - There is a scattering of young pine 21 to 40 years old at this point; of the 20 examined 4 were found infected with a total of 8 cankers which were destroyed.

Ribes inspection - The Ribes were eradicated from this drainage in 1930. In the vicinity of this infection R. petiolare was abundant.

Remarks: This infection center, like the three preceding is only a short distance from the Long Meadow Creek infection and probably was started in 1927 by ascospores blown from that area.

5. Name - Beaver Creek infection.

Location - One mile from the mouth of the North Fork of the Clearwater River just inside the Clearwater National Forest.

Inspectors - H. G. Taylor, Clearwater Timber Company, reported infection on Ribes. E. Joy, I. Lane, September 3, 1930.

[illegible]

... .. - referred

[illegible]

11. 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642

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located. This center is probably of local origin. A total of 2 coccidia were found on the infected tree. Excellent results occur on all of the trees examined in the

1944-1945

...the

1. The first of these is the fact that the Commission has not yet received any information from the Government of the United Kingdom regarding the progress of its investigation into the activities of the British Security Co-ordination Unit (BSCU) in the United States. It is therefore necessary to rely on the information provided by the BSCU itself, which is highly confidential and subject to strict security controls. This makes it difficult for the Commission to verify the accuracy of the information and to ensure that it is not being used for purposes other than those for which it was intended.

4 - 000000 - 000000

Location - 8.4 miles from Little River

14952

SECRET

Time Inspection - There is a collection of about 1000
 items at this point; of the 1000 items 4 were found to be
 a total of 8 cameras which were destroyed.

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D. Name - Beaver Creek Inflection.

U.S. DEPARTMENT OF AGRICULTURE

100-443887-100

Investigator - E. J. Taylor, District Attorney, Portland, Oregon
 Division of Police, E. J. Taylor, Portland, Oregon, 1937

Pine inspection - An excellent stand of mature timber grows to the edge of the stream type. A few suppressed trees 21 to 40 years old were found in the stream type. Several of these had been cut by the surveyors during the construction of a flume. Ten trees were examined and four of these found to be infected with a total of 38 cankers. The infected trees were destroyed.

Ribes inspection - R. petiolare and R. lacustre grow in scattered patches on this part of Beaver Creek. Immediately adjacent to the infected trees were two R. petiolare bushes with 100 per cent of the leaves infected. Other bushes a short distance away were not infected.

Remarks: Because of the presence of several cankers on 1924-26 growth that had fruited more than once, this infection appears to have originated before 1927. The complete analysis of cankers indicates the possibility of infection having originated in 1923 or 1926. All infected trees found were destroyed.

6. Name - North Fork Reed's Creek infection (upper).

Location - 1/2 mile below Headquarters, Idaho.

Inspectors - M. Joy, R. Myers, September 12, 1930.

Pine inspection - The Clearwater Timber Company has logged on this area leaving a good stand of pole-size timber. A few suppressed trees 21 to 40 years old were found in the stream type. 30 trees were examined, of which 7 were found to be infected with a total of 34 cankers.

Ribes inspection - The Ribes were eradicated from this drainage in 1929. An abundance of large R. petiolare and R. lacustre seedlings was found along the railroad grade and in a swampy cove on the west slope. No infected bushes were found.

Remarks: Heavy Ribes infection was found at this point in 1928. The canker analysis shows this center to be of 1927 origin.

7. Name: Quartz Creek infection.

Location: At Clearwater Timber Company Camp 12.

Inspectors: Ribes infection found by F. Heinrich. Pine infection found by C. Strong in the party with S. B. Detwiler and G. E. Posey August 28, 1930. Intensively scouted by M. Lane and L. Nelson August 29, 1930.

Pine inspection - Young pines 21 to 40 years old are abundant in the stream type and at the edge of the mature timber. The original data taken were lost. It is estimated that 350 trees were examined, 26 of which were found to be infected. The total number of cankers is approximately 31.

Ribes inspection - The Ribes in this drainage were eradicated in 1930. Heavy infection on R. petiolare was found by F. Heinrich, Ribes eradication camp boss, at the time the bushes were being sprayed. Other infected bushes were found in this vicinity after examination of the dried leaves.

Remarks: This infection is probably of 1927 origin. No fruiting cankers were found here but heavy infection of the Ribes indicates that some are in the vicinity. All cankers found were destroyed.

8. Name - Rhodes Creek infection.

Location - 1/4 mile above old gold dredge and new sawmill near Pierce, Idaho.

Inspectors - E. Joy, R. Myers, K. Lane, L. Nelson September 3, 1930.

Pine inspection - White pines 21 to 40 years old are abundant at this point. 500 trees were examined, 62 of which were infected with 179 cankers. All infected pines were cut out.

Ribes inspection - Ribes infection was found in this locality both in 1928 and 1929 but no infected pines could be located. A very small amount of infection was found on the Ribes in 1930. There is a large amount of R. petiolare along the stream near this infection, and some R. lacustre. R. viscosissimum is found scattered on the slopes.

Remarks: After the discovery of one old canker on 1923 growth it was determined that this infection started in 1923. All other cankers were formed in 1926, 1927 or 1928.

9. Name - Orofino Creek infection.

11. Name - Orofino Creek infection.

Location - 6 chains below old dredge, near Pierce, Idaho.

Inspectors - K. Lane, E. Joy September 9, 1930.

Pine inspection - White pine reproduction 1 to 20 years old grows in abundance on the rocky dredge tailings in this drainage. 300 trees were inspected, 13 of which were infected.

The investigation - found that in 1941 there were abundant
in the stream just west of the main bridge. The stream
was found to be in excellent condition. It is estimated that there were about
50 of which were found in the stream. The total number of
is approximately 10.

The investigation - The fishes in this drainage were eradicated
in 1941. Most of the fishes were found in the stream. The
eradication was done by the use of rotenone. The stream was
found to be in excellent condition. It is estimated that there were about
50 of which were found in the stream. The total number of
is approximately 10.

Conclusion: This investigation is a study of the stream. The
stream was found to be in excellent condition. It is estimated that there were about
50 of which were found in the stream. The total number of
is approximately 10.

8. Notes - Notes taken during the investigation.
The investigation - The fishes in this drainage were eradicated
in 1941. Most of the fishes were found in the stream. The
eradication was done by the use of rotenone. The stream was
found to be in excellent condition. It is estimated that there were about
50 of which were found in the stream. The total number of
is approximately 10.

Investigation - The fishes in this drainage were eradicated
in 1941. Most of the fishes were found in the stream. The
eradication was done by the use of rotenone. The stream was
found to be in excellent condition. It is estimated that there were about
50 of which were found in the stream. The total number of
is approximately 10.

The investigation - The fishes in this drainage were eradicated
in 1941. Most of the fishes were found in the stream. The
eradication was done by the use of rotenone. The stream was
found to be in excellent condition. It is estimated that there were about
50 of which were found in the stream. The total number of
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in 1941. Most of the fishes were found in the stream. The
eradication was done by the use of rotenone. The stream was
found to be in excellent condition. It is estimated that there were about
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The investigation - The fishes in this drainage were eradicated
in 1941. Most of the fishes were found in the stream. The
eradication was done by the use of rotenone. The stream was
found to be in excellent condition. It is estimated that there were about
50 of which were found in the stream. The total number of
is approximately 10.

8. Notes - Notes taken during the investigation.

Investigation - The fishes in this drainage were eradicated
in 1941. Most of the fishes were found in the stream. The
eradication was done by the use of rotenone. The stream was
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50 of which were found in the stream. The total number of
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Investigation - The fishes in this drainage were eradicated
in 1941. Most of the fishes were found in the stream. The
eradication was done by the use of rotenone. The stream was
found to be in excellent condition. It is estimated that there were about
50 of which were found in the stream. The total number of
is approximately 10.

The investigation - The fishes in this drainage were eradicated
in 1941. Most of the fishes were found in the stream. The
eradication was done by the use of rotenone. The stream was
found to be in excellent condition. It is estimated that there were about
50 of which were found in the stream. The total number of
is approximately 10.

The 18 cankers found were all destroyed.

Ribes inspection - R. petiolare is found in patches along the creek and swampy places near the edge of the dredge worked strip and scattered R. viscosissimum and R. lacustre grow on the undisturbed soil outside this strip. Infection was found in 1928 on R. petiolare in the area where the infected pines were located. Many of the infected trees were in close association with R. viscosissimum and R. lacustre indicating the probability that these species caused some of the infection.

Remarks: Analysis of the cankers found shows that this infection was started in 1928, the year infection was found on Ribes at this point. This is one of several instances where pine infection has been found by using the Ribes infection as a lead.

10. Name - Hammond Creek infection.

Location - 6 miles northeast of Avery at road crossing of Hammond Creek.

Inspectors - H. Putnam, C. Chapman, September 12, 1931.

Pine inspection - The pines in this vicinity, 11 to 20 years old, form part of a Forest Service plantation. Only one tree of 170 examined was found infected. The lone canker discovered, in the juvenile stage on 1926 growth, coupled with abundant infection on nearby Ribes, indicates the existence of a center of infection which originated in 1927 or earlier.

Ribes inspection - Several infected bushes of R. petiolare were found both up stream and down stream from the infected pine. R. viscosissimum and R. lacustre examined were not infected.

Remarks: This infection marks the location of the disease for the first time in the St. Joe National Forest. It is planned to do a large amount of scouting on this forest in 1931.

11. Name - Merry Creek infection.

Location - Immediately above the junction of the East and North Forks, near Clarkia.

Inspectors - F. Stant, R. Myers, C. Chapman, July 1, 1930.

Pine inspection - In this drainage there is a very heavy stand of thrifty white pine 41 to 60 years old. It is estimated that 1,000

The following table shows the results of the investigation.

Table 1 - Results of the investigation
The following table shows the results of the investigation. The first column shows the name of the person, the second column shows the date of birth, the third column shows the date of death, and the fourth column shows the cause of death.

Table 2 - Results of the investigation
The following table shows the results of the investigation. The first column shows the name of the person, the second column shows the date of birth, the third column shows the date of death, and the fourth column shows the cause of death.

Table 3 - Results of the investigation

Table 4 - Results of the investigation

Table 5 - Results of the investigation

Table 6 - Results of the investigation
The following table shows the results of the investigation. The first column shows the name of the person, the second column shows the date of birth, the third column shows the date of death, and the fourth column shows the cause of death.

Table 7 - Results of the investigation
The following table shows the results of the investigation. The first column shows the name of the person, the second column shows the date of birth, the third column shows the date of death, and the fourth column shows the cause of death.

Table 8 - Results of the investigation
The following table shows the results of the investigation. The first column shows the name of the person, the second column shows the date of birth, the third column shows the date of death, and the fourth column shows the cause of death.

Table 9 - Results of the investigation

Table 10 - Results of the investigation

Table 11 - Results of the investigation

Table 12 - Results of the investigation
The following table shows the results of the investigation. The first column shows the name of the person, the second column shows the date of birth, the third column shows the date of death, and the fourth column shows the cause of death.

trees were examined and 100 found to be infected. No records were kept of the intensive work done in this drainage by various matters of the personnel.

Seager reports available indicate that this infection is of 1927 origin.

Ribes inspection - In this drainage occur five species of Ribes, namely, R. petiolare, R. triste, R. inerme, R. viscosissimum and R. lacustre. A considerable amount of infection was seen in R. petiolare and R. triste but none was found on the last three species named.

Remarks: The Merry Creek infection is approximately two miles from the St. Maries River infection which, in all probability is the source of aeciospores causing many small centers in this vicinity.

Table No. 4 which follows shows the pine infection intensity and the accompanying Ribes conditions on these 11 areas.

| Area | Pine Infection | | Ribes | | Remarks |
|---------------------|----------------|---------------------|-----------|---------------------|---------|
| | Intensity | Area | Intensity | Area | |
| 1. St. Maries River | 100 | 1. St. Maries River | 100 | 1. St. Maries River | |
| 2. Merry Creek | 100 | 2. Merry Creek | 100 | 2. Merry Creek | |
| 3. ... | ... | 3. ... | ... | 3. ... | |
| 4. ... | ... | 4. ... | ... | 4. ... | |
| 5. ... | ... | 5. ... | ... | 5. ... | |
| 6. ... | ... | 6. ... | ... | 6. ... | |
| 7. ... | ... | 7. ... | ... | 7. ... | |
| 8. ... | ... | 8. ... | ... | 8. ... | |
| 9. ... | ... | 9. ... | ... | 9. ... | |
| 10. ... | ... | 10. ... | ... | 10. ... | |
| 11. ... | ... | 11. ... | ... | 11. ... | |

Ribes eliminated in 1927
 infection eliminated in 1928

There were examined 100 found to be infected. No records were kept of the intensive work done in this drainage by various members of the personnel.

Major reports available indicate that infection is in 1937 origin.

Notes: In this drainage occur five species of Ribes, namely, R. cereum, R. cynosbati, R. viscidifolium and R. lacustre. A considerable amount of infection was seen on R. viscidifolium and R. lacustre but none was found on the last three species named.

Remarks: The heavy growth infection is apparently in the form of the Ribes river infection which, in its development, is the source of infection causing early death of the plants.

Table no. 4 which follows shows the time infection intensity and the corresponding types of infection on these Ribes.

The insects
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in 1922.

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TABLE NO. 4

ALBES ABUNDANCE AND FINE CANKERS AT INFECTION CENTERS

| Area | Ribes Abundance: Light, Medium, Heavy | | | | | Cankers Originating
In 1923 Since 1923 |
|-----------------------------------|---------------------------------------|-----------|----------|---------|---------|---|
| | S. pet. | R. triste | R. iner. | N. vis. | R. lac. | |
| Johnson Creek | M | O | M | O | L | 16 |
| Shattuck Creek | M | O | M | O | L | 1 |
| Cameron Creek (lower)* | M | O | L | O | L | 5 |
| Cameron Creek (upper)* | M | O | O | O | L | 8 |
| Beaver Creek | L | O | O | O | L | 39 |
| North Fork Mead's Creek (upper)** | M | O | O | O | L | 34 |
| Quartz Creek | M | O | O | O | L | 21 |
| Rhodes Creek | M | O | O | L | L | 178 |
| Grofino Creek | L | O | O | L | L | 18 |
| Asamoni Creek | M | O | O | M | M | 1 |
| Merry Creek | M | L | L | L | L | 125 (Est.) |

*Albes eradicated in 1920.

**Albes eradicated in 1925.

DISCUSSION

The Idaho scouting work in 1930 was done in the drainages of 38 streams. In 36 of these no infection was found. Of the 20 drainages in which infection was found 4 had pine infection only, 12 had Ribes infection only, and 6 had infection on both hosts.

As in the past two years, most of the infection found in 1930 was in the southern part of the white pine region where M. petiolare grows in abundance. It is important to note that of the 13 pine infections found in this southern part, 4 originated in 1923 and 11 since that date. Because only a small per cent of the total area is scouted and it is much easier to locate the large centers of 1923 origin, it is probable that the number of infection centers started since 1923 is 10 times the number of 1923 centers in existence instead of 3-3/4 times as shown above.

COSTS

The following is a summary of the costs for scouting in Idaho in 1930.

| | |
|-------------------|--------------------|
| Salaries..... | \$819.66 |
| Expenses..... | 347.80 |
| Total..... | \$ 1,167.46 |

CONCLUSION

Scouting in Idaho for the last two years has been done mostly in the southern part of the white pine belt. In 1931 an intensive program of scouting should be planned for the northern two-thirds of this belt in order to get a more complete picture of infection conditions in this region. In the future more emphasis should be given scouting for blister rust in the upland types because it is here that many of the close host plant associations are to be found. Also, it is only recently that it has been forcibly brought to our attention by the Long Meadow Creek infection that the upland species of Ribes are extremely important in the intensification of the disease.

5 600 201 12 100 000
20 000 10 100 000 100 000

... a bad time for ...
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1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

1880

Label

SECRET

BLISTER RUST CONTROL WORK IN WASHINGTON

1930

Blister rust control activities in Washington were continued as a cooperative project between the Bureau of Plant Industry and the Washington State Department of Agriculture. There is given below the amendment to the basic memorandum of understanding, which was drawn up to cover the cooperative work for the fiscal year 1931 beginning July 1, 1930:

AMENDMENT TO
MEMORANDUM OF UNDERSTANDING

Effective July 1, 1931

Between
THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF PLANT INDUSTRY
and the
WASHINGTON STATE DEPARTMENT OF AGRICULTURE.

Cooperative work in Controlling White-Pine Blister Rust in
Blister Rust Control and the WASHINGTON

Paragraph C-6 of the Memorandum of Understanding described above contains the following:

"For the Fiscal Year 1928, the Bureau of Plant Industry shall contribute in value approximately \$13,000 to the support of this cooperative work, and the Washington State Department of Agriculture shall contribute in value approximately \$8,000; thereafter the amount to be contributed by each shall be determined and agreed upon by supplemental correspondence."

In accordance with the foregoing provision, it is mutually agreed that for the fiscal year ending June 30, 1931 there will be contributed in value by the Washington State Department of Agriculture approximately \$8,000.00, and by the United States Department of Agriculture, Bureau of Plant Industry, through its Office of Blister-Rust Control approximately \$7,700.00 in connection with cooperative blister-rust-control work in Washington.

Date:

Signature:

6-3-30

(s) Erle J. Barnes

Director, Washington State Department of
Agriculture.

June 19, 1930

(s) Wm. A. Taylor

Chief, Bureau of Plant Industry.

REPORT ON THE WORK OF THE

1931

After your report on the work of the Bureau of Plant Industry and the Department of Agriculture, there is given below the report on the work of the Bureau of Plant Industry, which was made in 1931. The report is given for the fiscal year 1931, which was the year in which the cooperative work of the Bureau of Plant Industry was made.

1931:

REPORT ON THE WORK OF THE

BUREAU OF PLANT INDUSTRY

Effective July 1, 1931

Report

THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF PLANT INDUSTRY

and the

ADMINISTRATIVE STAFF OF AGRICULTURE

Cooperative work in controlling diseases of plants and in

1931

1931

Paragraph 1 of the memorandum of the Bureau of Plant Industry above contains the following:

"For the fiscal year 1931, the Bureau of Plant Industry shall contribute in value approximately \$10,000 to the support of this cooperative work, and the Department of Agriculture shall contribute in value approximately \$8,000; the total amount to be contributed by each shall be determined and agreed upon by supplemental contract."

In accordance with the foregoing provision, it is hereby agreed that for the fiscal year ending June 30, 1931, there will be contributed in value by the Department of Agriculture approximately \$8,000.00, and by the United States Department of Agriculture, Bureau of Plant Industry, through its Office of Plant Industry Control approximately \$10,000.00 in connection with cooperative plant-control work in Washington.

Signature:

Date:

(s) Erle J. Barnes

6-3-31

(s) W. A. Taylor

June 15, 1931

Chief, Bureau of Plant Industry

M. C. Riley
 Junior Forester

These were also covered with the notation of "Underground" and "Secret". The following files were INTRODUCTION

White pine blister rust was found on Ribes in the general vicinity of Mount Rainier National Park in 1927 on Big Creek at the Rainier National Forest boundary. Blister rust was first found within the Park boundary in 1928 when it was seen on Ribes along the Disqually River below Longmire. Pine infection was first found in the spring of 1930 on Fish Creek along the West Side Highway at a point about two and one-half miles north of the Longmire Highway.

In the fall of 1948, at the request of the Park Service, Department of the Interior, officials of the Office of Blister Rust Control examined certain designated areas containing white pine and gave their technical recommendations regarding the feasibility of initiating blister rust control and the probable cost of the work.

The work of actual Ribes eradication covered by this report was financed by the Park Service. Personnel of the Office of Elster Pest Control supervised the work.

The purpose of the work was to complete the eradication of Ribes over a sufficient area to insure protection of the designated white pine stands on the basis of what is now known regarding the extent of protection zone necessary.

The areas designated to be protected are generally known as Longmire and the Silver Forest. The Longmire area centers around Park Headquarters and consists of a rather extensive area on which white pine constitutes a valuable part of the timber stand. This area was deemed important, because a majority of the people now visiting the Park enter through the Wislually Valley and pass through Longmire.

870. The Silver Forest area is located about two miles by air line northeast of Longview. This is a burn which supports a fine stand of young white pine and through which passes the highway to Paradise Valley.

Because of the fact that the two main cross sections above are only two miles apart it was necessary to work all of the stream types between them.

WHITE SLAVE TRAFFIC IN THE UNITED STATES

1

M. G. Riley

Director, Bureau of Investigation

INTRODUCTION

White slave traffic was found on a large scale in the United States in 1907 on the basis of the testimony of a woman who had been held in a house of prostitution in New York City. This woman, who was known as "Daisy", testified that she had been held in a house of prostitution in New York City for a period of two years. During this time, she had been subjected to various forms of abuse and had been forced to engage in prostitution. Her testimony was corroborated by other witnesses, and it was on the basis of this evidence that the Bureau of Investigation began its investigation into white slave traffic in the United States.

In the fall of 1907, the Bureau of Investigation, under the direction of the Director, M. G. Riley, began its investigation into white slave traffic in the United States. The Bureau was organized into several divisions, each of which was assigned to a specific task. The first division was assigned to the task of investigating the sources of the white slave traffic. This division was headed by the Assistant Director, J. Edgar Hoover. The second division was assigned to the task of investigating the methods of the white slave traffic. This division was headed by the Assistant Director, J. Edgar Hoover. The third division was assigned to the task of investigating the victims of the white slave traffic. This division was headed by the Assistant Director, J. Edgar Hoover.

The work of the Bureau of Investigation was carried out in a systematic and thorough manner. The Bureau was organized into several divisions, each of which was assigned to a specific task. The first division was assigned to the task of investigating the sources of the white slave traffic. This division was headed by the Assistant Director, J. Edgar Hoover. The second division was assigned to the task of investigating the methods of the white slave traffic. This division was headed by the Assistant Director, J. Edgar Hoover. The third division was assigned to the task of investigating the victims of the white slave traffic. This division was headed by the Assistant Director, J. Edgar Hoover.

SCOPE OF THE WORK

The purpose of the work was to determine the extent of the white slave traffic in the United States. The Bureau was organized into several divisions, each of which was assigned to a specific task. The first division was assigned to the task of investigating the sources of the white slave traffic. This division was headed by the Assistant Director, J. Edgar Hoover. The second division was assigned to the task of investigating the methods of the white slave traffic. This division was headed by the Assistant Director, J. Edgar Hoover. The third division was assigned to the task of investigating the victims of the white slave traffic. This division was headed by the Assistant Director, J. Edgar Hoover.

LOCATION OF THE TRAFFIC

The white slave traffic was found to be most prevalent in the United States in the following cities: New York City, Chicago, San Francisco, and Los Angeles. In each of these cities, the Bureau of Investigation found a large number of houses of prostitution where white slave traffic was being carried on. The Bureau of Investigation was organized into several divisions, each of which was assigned to a specific task. The first division was assigned to the task of investigating the sources of the white slave traffic. This division was headed by the Assistant Director, J. Edgar Hoover. The second division was assigned to the task of investigating the methods of the white slave traffic. This division was headed by the Assistant Director, J. Edgar Hoover. The third division was assigned to the task of investigating the victims of the white slave traffic. This division was headed by the Assistant Director, J. Edgar Hoover.

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Because of the fact that the two main sources of the white slave traffic were in New York City and Chicago, the Bureau of Investigation was organized into several divisions, each of which was assigned to a specific task. The first division was assigned to the task of investigating the sources of the white slave traffic. This division was headed by the Assistant Director, J. Edgar Hoover. The second division was assigned to the task of investigating the methods of the white slave traffic. This division was headed by the Assistant Director, J. Edgar Hoover. The third division was assigned to the task of investigating the victims of the white slave traffic. This division was headed by the Assistant Director, J. Edgar Hoover.

between them

All of the area supporting Ribes was worked along the Nisqually River from a point one mile below Longmire to the Nisqually Glacier. The tributaries of the Nisqually were completed for a sufficient distance to insure protection of the pine stands. Paradise Creek was worked from its mouth to Narada Falls. The tributaries of Paradise Creek were also covered with the exception of Latook Creek. All of the area from which Ribes were eradicated was classed as stream type. Generally speaking, the timber stands are so dense that they have practically no Ribes.

Ribes bracteosum, R. lacustre and R. laxiflorum are generally distributed over the area. Nisqually River and Paradise Creek have their origin in glaciers of the same names. Due to melting of the glaciers in the summer season, water rises during the day and recedes at night, and the continuous depositing of silt on the low flats bordering the stream beds made eradication extremely difficult in many instances.

METHODS, EQUIPMENT AND MATERIALS

The prime motive governing the work on Mount Rainier National Park was the preservation of natural beauty, and in view of this it was not deemed advisable to use toxic sprays, the application of which would have been the cheapest method of destroying many dense masses of susceptible currants and gooseberries. The hand pulling method of Ribes eradication was used entirely. It consisted of covering the ground with three-man crews with the foreman working in line.

All men were furnished quarters and subsistence at the Park Service camp at Longmire during the entire season. Transportation when needed was furnished by the Park Service.

The necessary wine was furnished by the Office of Ellater Rust Control, as were some of the special California Ribes tools which proved to be more satisfactory than any other type tried. Other tools and equipment were furnished by the Park Service.

Maps of the area covered by this report are on file in the Spokane and Washington offices.

RESULTS OF WORK

The results of the work on Mount Rainier National Park during the 1930 field season are tabulated as follows:

TABLE NO. 1

SUMMARY OF RESULTS OF RIBES ENAMICATION, MOUNT RAINIER NATIONAL PARK, 1930

| Tradi-
tion
Class | Man-Days | | | Number Ribes Pulled | | | | | | Acres
Per
Man
Day |
|-------------------------|--------------|--------------|---------|---------------------|-------------|------------|-------------|------------|-------------|----------------------------|
| | Crew-
man | Fore-
man | Total | R.
lac. | R.
brac. | H.
lac. | H.
brac. | H.
lac. | H.
brac. | |
| B | 40.9 | 20.8 | 61.7 | 134.5 | 7,058 | 2,414 | 1,718 | 61 | 8 | 12,059 |
| C | 258.6 | 130.7 | 389.3 | 234.4 | 73,842 | 34,047 | 18,069 | 1,812 | - | 139,577 |
| D | 201.5 | 125.7 | 327.2 | 25.6 | 60,060 | 31,587 | 22,731 | 777 | 8 | 115,163 |
| A | 128.0 | 54.8 | 182.8 | 24.9 | 29,781 | 17,790 | 11,220 | 163 | - | 58,954 |
| Totals or
Averages | 679.0 | 333.0 | 1,012.0 | 559.4 | 173,538 | 86,848 | 53,738 | 2,813 | 16 | 316,753 |
| | | | | | | | | | | .55 |

TABLE NO. 2

AVERAGE NUMBER OF RIBES PER ACRE MOUNT RAINIER NATIONAL PARK, 1930

| Class | Acres
Worked | Number Ribes Per acre | | | | | |
|-----------------------|-----------------|-----------------------|-------------|------------|-------------|------------|-------------|
| | | R.
lac. | R.
brac. | H.
lac. | H.
brac. | R.
lac. | R.
brac. |
| B | 154.5 | 50.9 | 15.6 | 11.1 | .4 | .1 | .1 |
| C | 294.4 | 257.6 | 118.4 | 51.4 | 6.2 | - | - |
| D | 85.3 | 701.5 | 389.1 | 238.5 | 9.0 | .1 | .1 |
| A | 24.9 | 1,195.0 | 71.5 | 430.6 | 5.5 | - | - |
| Totals or
Averages | 559.4 | 317.4 | 154.9 | 96.1 | 5.0 | - | - |
| | | | | | | | 535.2 |

1. 1875. 2. 1876. 3. 1877. 4. 1878. 5. 1879. 6. 1880. 7. 1881. 8. 1882. 9. 1883. 10. 1884. 11. 1885. 12. 1886. 13. 1887. 14. 1888. 15. 1889. 16. 1890. 17. 1891. 18. 1892. 19. 1893. 20. 1894. 21. 1895. 22. 1896. 23. 1897. 24. 1898. 25. 1899. 26. 1900. 27. 1901. 28. 1902. 29. 1903. 30. 1904. 31. 1905. 32. 1906. 33. 1907. 34. 1908. 35. 1909. 36. 1910. 37. 1911. 38. 1912. 39. 1913. 40. 1914. 41. 1915. 42. 1916. 43. 1917. 44. 1918. 45. 1919. 46. 1920. 47. 1921. 48. 1922. 49. 1923. 50. 1924. 51. 1925. 52. 1926. 53. 1927. 54. 1928. 55. 1929. 56. 1930. 57. 1931. 58. 1932. 59. 1933. 60. 1934. 61. 1935. 62. 1936. 63. 1937. 64. 1938. 65. 1939. 66. 1940. 67. 1941. 68. 1942. 69. 1943. 70. 1944. 71. 1945. 72. 1946. 73. 1947. 74. 1948. 75. 1949. 76. 1950. 77. 1951. 78. 1952. 79. 1953. 80. 1954. 81. 1955. 82. 1956. 83. 1957. 84. 1958. 85. 1959. 86. 1960. 87. 1961. 88. 1962. 89. 1963. 90. 1964. 91. 1965. 92. 1966. 93. 1967. 94. 1968. 95. 1969. 96. 1970. 97. 1971. 98. 1972. 99. 1973. 100. 1974. 101. 1975. 102. 1976. 103. 1977. 104. 1978. 105. 1979. 106. 1980. 107. 1981. 108. 1982. 109. 1983. 110. 1984. 111. 1985. 112. 1986. 113. 1987. 114. 1988. 115. 1989. 116. 1990. 117. 1991. 118. 1992. 119. 1993. 120. 1994. 121. 1995. 122. 1996. 123. 1997. 124. 1998. 125. 1999. 126. 2000. 127. 2001. 128. 2002. 129. 2003. 130. 2004. 131. 2005. 132. 2006. 133. 2007. 134. 2008. 135. 2009. 136. 2010. 137. 2011. 138. 2012. 139. 2013. 140. 2014. 141. 2015. 142. 2016. 143. 2017. 144. 2018. 145. 2019. 146. 2020. 147. 2021. 148. 2022. 149. 2023. 150. 2024. 151. 2025. 152. 2026. 153. 2027. 154. 2028. 155. 2029. 156. 2030. 157. 2031. 158. 2032. 159. 2033. 160. 2034. 161. 2035. 162. 2036. 163. 2037. 164. 2038. 165. 2039. 166. 2040. 167. 2041. 168. 2042. 169. 2043. 170. 2044. 171. 2045. 172. 2046. 173. 2047. 174. 2048. 175. 2049. 176. 2050. 177. 2051. 178. 2052. 179. 2053. 180. 2054. 181. 2055. 182. 2056. 183. 2057. 184. 2058. 185. 2059. 186. 2060. 187. 2061. 188. 2062. 189. 2063. 190. 2064. 191. 2065. 192. 2066. 193. 2067. 194. 2068. 195. 2069. 196. 2070. 197. 2071. 198. 2072. 199. 2073. 200. 2074. 201. 2075. 202. 2076. 203. 2077. 204. 2078. 205. 2079. 206. 2080. 207. 2081. 208. 2082. 209. 2083. 210. 2084. 211. 2085. 212. 2086. 213. 2087. 214. 2088. 215. 2089. 216. 2090. 217. 2091. 218. 2092. 219. 2093. 220. 2094. 221. 2095. 222. 2096. 223. 2097. 224. 2098. 225. 2099. 226. 2100. 2101. 2102. 2103. 2104. 2105. 2106. 2107. 2108. 2109. 2110. 2111. 2112. 2113. 2114. 2115. 2116. 2117. 2118. 2119. 2120. 2121. 2122. 2123. 2124. 2125. 2126. 2127. 2128. 2129. 2130. 2131. 2132. 2133. 2134. 2135. 2136. 2137. 2138. 2139. 2140. 2141. 2142. 2143. 2144. 2145. 2146. 2147. 2148. 2149. 2150. 2151. 2152. 2153. 2154. 2155. 2156. 2157. 2158. 2159. 2160. 2161. 2162. 2163. 2164. 2165. 2166. 2167. 2168. 2169. 2170. 2171. 2172. 2173. 2174. 2175. 2176. 2177. 2178. 2179. 2180. 2181. 2182. 2183. 2184. 2185. 2186. 2187. 2188. 2189. 2190. 2191. 2192. 2193. 2194. 2195. 2196. 2197. 2198. 2199. 2200. 2201. 2202. 2203. 2204. 2205. 2206. 2207. 2208. 2209. 2210. 2211. 2212. 2213. 2214. 2215. 2216. 2217. 2218. 2219. 2220. 2221. 2222. 2223. 2224. 2225. 2226. 2227. 2228. 2229. 2230. 2231. 2232. 2233. 2234. 2235. 2236. 2237. 2238. 2239. 2240. 2241. 2242. 2243. 2244. 2245. 2246. 2247. 2248. 2249. 2250. 2251. 2252. 2253. 2254. 2255. 2256. 2257. 2258. 2259. 2260. 2261. 2262. 2263. 2264. 2265. 2266. 2267. 2268. 2269. 2270. 2271. 2272. 2273. 2274. 2275. 2276. 2277. 2278. 2279. 2280. 2281. 2282. 2283. 2284. 2285. 2286. 2287. 2288. 2289. 2290. 2291. 2292. 2293. 2294. 2295. 2296. 2297. 2298. 2299. 2300. 2301. 2302. 2303. 2304. 2305. 2306. 2307. 2308. 2309. 2310. 2311. 2312. 2313. 2314. 2315. 2316. 2317. 2318. 2319. 2320. 2321. 2322. 2323. 2324. 2325. 2326. 2327. 2328. 2329. 2330. 2331. 2332. 2333. 2334. 2335. 2336. 2337. 2338. 2339. 2340. 2341. 2342. 2343. 2344. 2345. 2346. 2347. 2348. 2349. 2350. 2351. 2352. 2353. 2354. 2355. 2356. 2357. 2358. 2359. 2360. 2361. 2362. 2363. 2364. 2365. 2366. 2367. 2368. 2369. 2370. 2371. 2372. 2373. 2374. 2375. 2376. 2377. 2378. 2379. 2380. 2381. 2382. 2383. 2384. 2385. 2386.

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED

[illegible]

2

OF THE

[illegible]

TABLE NO. 3

COST OF OPERATION

| Item | Amount |
|---------------------------|-------------------|
| Salaries: | |
| Supervision | 1673.72 |
| Temporary men | 5,132.47 |
| Transportation of men | 105.20 |
| General equipment: | |
| Cost | 10.81 |
| Transportation | 10.00 |
| Miscellaneous: | |
| Trine | 28.80 |
| Expenses | 195.97 |
| Total | \$6,316.57 |

park and two were on the north side. All of the areas subjected were stream type and all except TABLE NO. 4 are located outside of the stream zone.

COST OF ERADICATION

| Eradi-
cation
Class | Total
Man-Days | Acres | Cost
Per Acre |
|-------------------------------|-------------------|--------------|------------------|
| B | 51.7 | 154.5 | \$2.49 |
| C | 389.3 | 194.4 | 8.25 |
| D | 373.2 | 85.5 | 27.57 |
| M | 187.8 | 24.2 | 45.31 |
| Totals or
Averages | 1,012.0 | 559.4 | \$11.29 |

Table No. 3 includes all funds expended for Ribes eradication both by the Park Service and the Office of Blister Rust Control. The cost per man-day including supervision was \$5.34. The cost per man-day on the basis of Park Service expenditure alone was \$5.18. The Office of Blister Rust Control expended \$1,068.09. The Department of the Interior expended \$5,248.43.

A report has been submitted covering the preliminary Ribes eradication survey of certain white pine areas on Mount Rainier National Park. The cost of this survey was borne by the Bureau of Plant Industry.

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1. The first of these is the fact that the Commission has not yet received any information from the Government of the United States regarding the activities of the Committee for the Liberation of the People of the South (CLPS) in the United States. The Commission is therefore unable to provide any information on this matter.

will certainly be a very important one and we hope to
have it completed soon. It is very important to have it
completed soon. It is very important to have it completed soon.

PRELIMINARY RIBES ERADICATION SURVEY
Mount Rainier National Park

Introduction

During the course of the 1930 field season the representatives of the Office of Blister Rust Control were requested by officials of the Park Service to examine other areas in the park containing white pine and to give their technical recommendations regarding the practicability of and the estimated cost of applying local control measures. The areas designated by the Park Service were examined and a report was given to the Park Service immediately upon completion of the work. No attempt was made to value the value of the white pine against the cost of protection so far as relative importance of the various areas was concerned.

Location and Description of the Areas

Four of the areas examined were on the south side of the park and two were on the north side. All of the areas contained such stream type and all except one contained Ribes outside of the stream type.

The Emerald Ridge, Longmire-Silver Forest, Rampart Ridge and White River-Yakima Park areas are all on scenic roads, and the Natchez River and Muddy Fork of Coalitz areas are situated on proposed roads. This fact makes all of the areas important because the main objectives of national parks are the preservation of natural beauty and an increased public enjoyment of recreational values.

All of the areas contain R. monticola, and the White River-Yakima Park area also contains a considerable amount of R. albidum. R. eractosum, R. laxiflorum and R. lacustre are common on all of the areas and R. scirifolium and R. divaricatum occur on the White River-Yakima Park area.

Procedure and Methods

The preliminary survey of stream type was based on the cost per acre according to comparable areas previously worked. All streams were examined intensively and a rough map was made showing the width and length of the stream type according to the per acre cost. Strips were run through the upland types sufficiently close together to give an accurate picture of the area. No attempt was made to list any of the areas by eradication classes.

In connection with the above listed areas, two other areas of white pine were examined, but neither were examined because the necessary protection was due to the scattered distribution of white pine.

Results of Work

The following table gives the results of the preliminary Ribes eradication survey: Junior Forester

TABLE NO. 1

RESULTS OF PRELIMINARY RIBES ERADICATION SURVEY

| Area | Acres to be worked | Acres to be protected | Age of white pine | Estimated Protection Cost | No. Men Required for Season |
|---------------------------------|--------------------|-----------------------|-------------------|---------------------------|-----------------------------|
| Emerald Ridge | 2,625 | 900 | 20-40 | \$7,065.00 | 21 |
| Longmire-Silver Forest | 2,900 | 1,950 | 20-40 | 1,700.00 | 20* |
| Lowich River | 515 | 110 | 100-200 | 2,300.00 | 12 |
| Muddy For. Cowlitz | 2,900 | 1,350 | 20-40 | 3,600.00 | 17 |
| Rampart Ridge | 2,820 | 1,025 | 20-40 | 4,850.00 | 20* |
| White River-Yakima Park | 5,000 | 2,310 | 20-80 | 3,420.00 | 11 |
| Totals in parts in north | 16,860 | 7,645 | - | \$25,515.00 | - |

* Both areas to be worked by same crew during one season.

personnel of the office in conjunction with other work being done. The estimated protection cost for the Longmire-Silver Forest area represents the work to be done in order to carry out the contemplated extension of the area, while the acreage figures represent the entire area including the acreage worked during the 1930 field season.

A. Northwestern Washington

The cost estimates given in the above table are for eradication only and do not include charges for such items as equipment, packing, trail construction, etc. The acreage to be protected is less than the acreage to be worked due to the fact that the latter figure includes a protective zone around the actual pine area and that it is also necessary to work the stream type for a considerable distance outside the pine area due to the presence of R. bracteatum on all of the streams.

In connection with the areas listed above, two other valleys of white pine were examined, but neither area would apparently warrant the necessary protection cost due to the scattered white pine and extensive dense concentrations of Ribes.

3711 to 3712

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RECEIVED BY THE DIRECTOR, FBI, 11/11/64

| Station | Latitude | Longitude | Altitude | Temperature | Humidity | Wind | Clouds | Remarks |
|---------|-----------|------------|----------|-------------|----------|------|--------|---------|
| 1 | 34° 15' N | 118° 10' W | 1000 | 65.0 | 75 | 10 | 100 | Clear |
| 2 | 34° 15' N | 118° 10' W | 1000 | 65.0 | 75 | 10 | 100 | Clear |
| 3 | 34° 15' N | 118° 10' W | 1000 | 65.0 | 75 | 10 | 100 | Clear |
| 4 | 34° 15' N | 118° 10' W | 1000 | 65.0 | 75 | 10 | 100 | Clear |
| 5 | 34° 15' N | 118° 10' W | 1000 | 65.0 | 75 | 10 | 100 | Clear |
| 6 | 34° 15' N | 118° 10' W | 1000 | 65.0 | 75 | 10 | 100 | Clear |
| 7 | 34° 15' N | 118° 10' W | 1000 | 65.0 | 75 | 10 | 100 | Clear |
| 8 | 34° 15' N | 118° 10' W | 1000 | 65.0 | 75 | 10 | 100 | Clear |
| 9 | 34° 15' N | 118° 10' W | 1000 | 65.0 | 75 | 10 | 100 | Clear |
| 10 | 34° 15' N | 118° 10' W | 1000 | 65.0 | 75 | 10 | 100 | Clear |

*. 1994. *Journal of the American Statistical Association* 89: 1111-1122.

1. The following information was obtained from a review of the records of the Department of the Interior, Bureau of Land Management, and the Bureau of Reclamation, and from interviews with the following persons:

[illegible]

In connection with the above stated matter, the above named
of this place were examined, and nothing was ascertained relative
the necessary information was not so furnished with a view and
and have been forwarded to him.

SCOUTING FOR BLISTER RUST IN WASHINGTON - 1930

By

E. L. Joy

Junior Forester

INTRODUCTION

Because of the known abundance of blister rust in the western part of the state and the small amount of white pine in the eastern part, very little scouting was done in Washington in 1930. There are a few important areas such as the Lind River Nursery and Mount Rainier National Park where some scouting is necessary in connection with the protection work being done.

PURPOSE

The purpose of scouting is to determine the extent and intensity of the disease.

LOCATION OF WORK

A small amount of work was done in the northeastern part of the state in conjunction with the north Idaho work. Other areas in the state where scouting was done are the Mount Rainier National Park and the vicinity of the Lind River Nursery.

PERSONNEL

The work in northeastern Washington was done by a crew of temporary men. In Mount Rainier National Park and at the Lind River Nursery scouting was done by members of both the permanent and temporary personnel of the office in conjunction with other work being performed on these areas.

RESULTS

A. Northeastern Washington

The disease was not found in the northeastern part of the state. The small amount of scouting done resulted in the examination of the following:

R. inermis - 550 bushes.
R. viscosissimum - 300 bushes.
R. lacustre - 260 bushes.
white pine - 1,275 trees.

White fir, Pinus albicaulis: The firs were eradicated from this area before eradication of bracteatum.
B. Mount Rainier National Park and Rainier National Forest

A large center of infection was found in Mount Rainier National Park near Longvire early in the season. Intensive searching since later revealed a total of three centers in the southwest corner of the Park and one 3 miles outside the Park boundary. A summary of these infections follows:

1. Name: Fish Creek infection.

Location: In Mount Rainier National Park along Fish and Longvire creeks and the West Side Highway, township 13 north, range 7 east, sections 23, 26 (unsurveyed).

Extent: 1-1/4 mile along Fish and Longvire creeks and up the slope west of Fish Creek for 1/4 mile.

Pine inspection: White pines 41 to 65 years old are scattered throughout the drainage. In the vicinity of the main center of infection, which is on Fish Creek, the pines are heavily infected and much branch killing is evident. It is estimated that the most severely infected trees have as high as 3,000 cankers per tree. This infection probably entered here about 1921.

White fir inspection: P. bracteatum, P. latifolia and P. lambertiana occur in abundance and are heavily infected near this center.

2. Name: Longvire infection.

Location: Just below Longvire, Washington, along the Nisqually River, township 13 north, range 5 east, section 3.

Pine inspection: Abundant young white pines were growing along the river at this point. Of the 47 trees examined, 13 were found infected with 68 cankers. Infection probably entered in 1921 or earlier. All infected trees were destroyed.

White inspection: P. bracteatum, P. latifolia and P. lambertiana were found in medium abundance and not heavily infected. The firs were eradicated from this drainage in 1921.

3. Name: Nisqually Glacier infection.

Location: 1/2 mile below the snout of Nisqually Glacier, township 13 north, range 5 east, section 15 (unsurveyed).

Pine inspection: Very few pines grow in this vicinity. Only one infected tree with one canker of 1927 origin was found.

Report received from the city council dated June 1907.

of the park and one 3 miles outside the park boundary. A number of these infections were

1. Name: _____

1. The first of these is the fact that the
2. second of these is the fact that the
3. third of these is the fact that the

Close west of Elm Street at 1st St.

Five hundred and fifty (550) copies of the report were distributed to the various departments of the Government and to the various States and Territories. The report was also published in the English, Spanish, and Chinese languages.

[illegible]

[Faint, illegible handwritten text]

Washington, D.C.

1. The following information was obtained from the files of the FBI, New York Office, dated 10/10/68, and 10/11/68, and 10/12/68, and 10/13/68, and 10/14/68, and 10/15/68, and 10/16/68, and 10/17/68, and 10/18/68, and 10/19/68, and 10/20/68, and 10/21/68, and 10/22/68, and 10/23/68, and 10/24/68, and 10/25/68, and 10/26/68, and 10/27/68, and 10/28/68, and 10/29/68, and 10/30/68, and 10/31/68, and 11/1/68, and 11/2/68, and 11/3/68, and 11/4/68, and 11/5/68, and 11/6/68, and 11/7/68, and 11/8/68, and 11/9/68, and 11/10/68, and 11/11/68, and 11/12/68, and 11/13/68, and 11/14/68, and 11/15/68, and 11/16/68, and 11/17/68, and 11/18/68, and 11/19/68, and 11/20/68, and 11/21/68, and 11/22/68, and 11/23/68, and 11/24/68, and 11/25/68, and 11/26/68, and 11/27/68, and 11/28/68, and 11/29/68, and 11/30/68, and 12/1/68, and 12/2/68, and 12/3/68, and 12/4/68, and 12/5/68, and 12/6/68, and 12/7/68, and 12/8/68, and 12/9/68, and 12/10/68, and 12/11/68, and 12/12/68, and 12/13/68, and 12/14/68, and 12/15/68, and 12/16/68, and 12/17/68, and 12/18/68, and 12/19/68, and 12/20/68, and 12/21/68, and 12/22/68, and 12/23/68, and 12/24/68, and 12/25/68, and 12/26/68, and 12/27/68, and 12/28/68, and 12/29/68, and 12/30/68, and 12/31/68.

1. The first of these is the fact that the United States is a democratic country. This means that the people have the right to elect their representatives to the government. This is a principle that is not shared by all countries.

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

Exhibit A: The amount of money spent on each item is shown below.

...and the fact that the two are not the same thing.

Ribes inspection: The Ribes were eradicated from this drainage. Before eradication, R. bracteosum, R. lacustre and R. laxiflorum were abundant.

4. Name: Lewis County Bridge infection.

Location: On both sides of the Rainier National Forest boundary at the township corner between township 14 and township 15 north, and range 6 and range 7 east, and for one mile east of this point along Big Creek.

Pine inspection: Young pines are quite abundant in this vicinity. Of the 250 examined, 8 were infected with a total of 12 cankers. This center probably originated in 1927.

Ribes inspection: In 1927 scattered infection was found on R. bracteosum, R. divaricatum and R. lacustre at this point. Only a very small amount of infection was found on the Ribes in this vicinity in 1930.

C. Wind River Nursery

A crew under the direction of the state leader of Oregon did a considerable amount of scouting in the vicinity of the Wind River Nursery. Three pine and three Ribes infection locations were found in this vicinity. A detailed report of these infections is presented in the following tables:

This document is a copy of a letter from the
 Federal Bureau of Investigation, dated 10/10/50, to the
 Bureau of the Census, Washington, D.C.

TABLE NO. 1

PINE INFECTIONS NEAR GIRD RIVER NEARLY, WASHINGTON

| County | Region | T. | S. | Host | Number of pines | | Inspec-
tors | Date | Remarks |
|-------------|----------|----|----|------|-----------------|----------|-----------------|-------------------------|---|
| | | | | | Exam. | Infected | | | |
| Skaneateles | Bea-lock | 41 | 61 | 27 | F. monticola | 15 | 1 | Oodding 5/14/30 | On 1927 wood fruited once |
| | | 41 | 61 | 28 | F. monticola | 26 | 1 | Lyle and Wilson 5/22/30 | On 1926 wood fruited once |
| | | 41 | 61 | 28 | F. monticola | 50 | 3 | Lyle and Wilson 5/22/30 | 9 cankers on 1925, 1926 and 1927 wood. Fruited once or twice. |

No reference is made to infected albes in proximity to diseased pines.

TABLE NO. 2

ALBES INFECTIONS NEAR GIRD RIVER NEARLY, WASHINGTON

| County | Region | T. | S. | Host | Number of albes | | Inf. Leaves | Infected Surface | | Inspector | Date |
|-------------|----------|----|----|------|-----------------|------|-------------|------------------|----------|-----------|---------|
| | | | | | Exam. | Inf. | | Drainage | Decrotic | | |
| Skaneateles | Bea-lock | 41 | 61 | 14 | A. bracteatum | 50 | 2 | 25 | 75 | 25 | 8/22/30 |
| | | 41 | 61 | 10 | A. sanguineum | 1 | 1 | 5 | 75 | 25 | 8/22/30 |
| | | 41 | 71 | 3 | A. bracteatum | 10 | 1 | 1 | 75 | 25 | 7/23/30 |

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DISCUSSION

Although the disease is generally distributed throughout the Cascades of western Washington, the Mount Rainier National Park infections are of considerable importance since protection work was started there this year.

Further scouting should be done in Mount Rainier National Park in order to determine the amount of infection present, such information being necessary in planning the control work for this unit. Because of the inaccessibility of much of the area and the meager information available as to the distribution of white pine on the park, a thorough scouting of this unit would require much time.

Infections found in the vicinity of the Wind River Nursery are very important because of the nursery sanitation program under way. Much scouting in this vicinity is necessary in order to determine the amount of infection to which the protected area is being subjected.

COSTS

Inasmuch as the scouting done in Washington was incidental to other work, the costs were not segregated.

CONCLUSIONS

Since blister rust has been found in abundance throughout western Washington, there is very little need for any extensive scouting program in this region except where small areas of importance, such as the two mentioned in this report, are involved. It is important though, that the Colville National Forest and adjacent areas in northeastern Washington be scouted thoroughly in 1931 for the purpose of completing the picture of infection conditions in the Inland Empire.

The support of the Washington State Board of Forestry approximately \$14,250, the Oregon State Board of Forestry approximately \$7,500, and the Oregon Agricultural College shall contribute in 1931 approximately \$1,250; thereafter the amount to be contributed by each shall be determined and agreed upon by supplemental correspondence.

In accordance with the foregoing provision, it is hereby agreed that for the fiscal year ending June 30, 1931, there shall be contributed in whole by the Oregon State Board of Forestry approximately \$7,500, by the Oregon State Board of Forestry approximately \$7,500, by the Oregon Agricultural College approximately \$1,250, by the Forest of Forestry of the Oregon State Board of Forestry approximately \$7,500, by the Forest of Forestry of the Oregon State Board of Forestry approximately \$7,500, by the Forest of Forestry of the Oregon State Board of Forestry approximately \$7,500.

DISCUSSION

Germany the disease is generally distributed throughout the country. Cases of severe infection, the most serious kind, have been reported from various parts of the country. These are of considerable importance since they indicate that the disease is still present in the country.

Further research should be done in order to determine the extent of the disease in the country. It is necessary to determine the control work for this disease. It is necessary to determine the extent of the disease in the country. It is necessary to determine the control work for this disease. It is necessary to determine the extent of the disease in the country. It is necessary to determine the control work for this disease.

Intentional control is the object of the first part of the study. It is very important because of the nature of the disease. It is very important because of the nature of the disease. It is very important because of the nature of the disease. It is very important because of the nature of the disease.

COSTS

Intentional control is the object of the first part of the study. It is very important because of the nature of the disease. It is very important because of the nature of the disease. It is very important because of the nature of the disease. It is very important because of the nature of the disease.

CONCLUSIONS

Since disease has been found in various parts of the country, it is necessary to determine the extent of the disease in the country. It is necessary to determine the control work for this disease. It is necessary to determine the extent of the disease in the country. It is necessary to determine the control work for this disease.

BLISTER RUST CONTROL WORK IN OREGON

Amount transferred from the 1930 P. S. Budget for Blister Rust Control Work, \$15,000, is hereby allocated as follows:

Blister rust control activities in Oregon were continued as a cooperative project between the Bureau of Plant Industry and the Oregon State Board of Horticulture, Oregon State Board of Forestry, Oregon State College, School of Forestry and the Extension Service. There is given below the amendment to the basic memorandum of understanding, which was drawn up to cover the cooperative work for the fiscal year 1931 beginning July 1, 1930:

AMENDMENT TO
MEMORANDUM OF UNDERSTANDING
Effective July 1, 1927

Between
THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF PLANT INDUSTRY
and the
OREGON STATE BOARD OF HORTICULTURE - - - OREGON STATE BOARD OF
FORESTRY - - - and the OREGON STATE COLLEGE

Cooperative Work in Controlling White-Pine Blister Rust in
OREGON

* * *

Paragraph E-6 of the Memorandum of Understanding described above contains the following:

"For the fiscal year 1928, the Bureau of Plant Industry shall contribute in value approximately \$16,000 to the support of the cooperative work, and the Oregon State Board of Horticulture approximately \$14,250, the Oregon State Board of Forestry approximately \$7,000, and the Oregon Agricultural College shall contribute in value approximately \$1,500; thereafter the amount to be contributed by each shall be determined and agreed upon by supplemental correspondence."

In accordance with the foregoing provision, it is mutually agreed that for the fiscal year ending June 30, 1931 there will be contributed in value by the Oregon State Board of Horticulture approximately \$7,000, by the Oregon State Board of Forestry approximately \$7,000, by the Botany Department of the Oregon State College approximately \$1,000, by the School of Forestry of the Oregon State College approximately \$250, by the Extension Service of the Oregon State College approximately

100

1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 26

1990年12月15日

THE UNIVERSITY OF CHICAGO PRESS

REMARKS:

7. The following information is for your information only:

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• • •

Paragraph 1-8 of the Memorandum of Understanding of the

the Oregon Agricultural College shall contribute in value approximately \$1,500; thereafter the amount to be contributed by each shall be determined by the State Board of Horticulture approximately \$11,500, the State Board of Forestry approximately \$7,000, and the support of the cooperative work, and the Oregon

IN accordance with the foregoing provisions, it is hereby
ordered that the annual report ending June 30, 1966, shall be sub-
mitted to the Oregon State Board of Education on or before
October 1, 1966, by the Oregon State Board of Education, and
the report of the Oregon State Board of Education shall be
submitted to the Oregon State Board of Education on or before
October 1, 1966, by the Oregon State Board of Education.

1930, and by the United States Department of Agriculture, Bureau of Plant Industry, Division of Plant Quarantine, Washington, D.C. 20250, in connection with comparative histological studies of Oregon, and in connection with the study of the history of the plant industry in Oregon.

- Date: _____
- (a) J. A. Taylor, Jr., President, Oregon State Society of Histology, June 10, 1930
- (a) J. A. Taylor, Jr., State Historian, Oregon State Society of Histology, June 10, 1930
- (a) J. A. Taylor, Jr., State Historian, Oregon State Society of Histology, June 10, 1930
- (a) J. A. Taylor, Jr., State Historian, Oregon State Society of Histology, June 10, 1930
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- (a) J. A. Taylor, Jr., State Historian, Oregon State Society of Histology, June 10, 1930
- (a) J. A. Taylor, Jr., State Historian, Oregon State Society of Histology, June 10, 1930

The following is a list of the names of the persons who have been elected to the office of State Historian of Oregon, and the dates of their election:

1. J. A. Taylor, Jr., June 10, 1930

2. J. A. Taylor, Jr., June 10, 1930

3. J. A. Taylor, Jr., June 10, 1930

4. J. A. Taylor, Jr., June 10, 1930

5. J. A. Taylor, Jr., June 10, 1930

6. J. A. Taylor, Jr., June 10, 1930

7. J. A. Taylor, Jr., June 10, 1930

8. J. A. Taylor, Jr., June 10, 1930

9. J. A. Taylor, Jr., June 10, 1930

10. J. A. Taylor, Jr., June 10, 1930

11. J. A. Taylor, Jr., June 10, 1930

12. J. A. Taylor, Jr., June 10, 1930

13. J. A. Taylor, Jr., June 10, 1930

14. J. A. Taylor, Jr., June 10, 1930

15. J. A. Taylor, Jr., June 10, 1930

16. J. A. Taylor, Jr., June 10, 1930

17. J. A. Taylor, Jr., June 10, 1930

18. J. A. Taylor, Jr., June 10, 1930

19. J. A. Taylor, Jr., June 10, 1930

20. J. A. Taylor, Jr., June 10, 1930

21. J. A. Taylor, Jr., June 10, 1930

22. J. A. Taylor, Jr., June 10, 1930

23. J. A. Taylor, Jr., June 10, 1930

24. J. A. Taylor, Jr., June 10, 1930

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BLISTER RUST CONTROL WORK IN OREGON, 1930

By
D. M. Goodding
Associate Pathologist

Blister rust work in Oregon during 1930 consisted largely in continuing work begun in 1929. For convenience, the nursery sanitation at Wind River, Washington is considered as a part of the Oregon work.

RIBES ERADICATION IN THE STILL CREEK AREA, 1930

Work was resumed in 1930 on clearing the Ribes from the Still Creek area. The nature of the territory worked and the lack of concentration of the blocks planted to pine have necessitated clearing Ribes from fully twice the area to be protected. Even with this wide margin, it is questionable whether full protection will be afforded. On the whole the project has been quite discouraging. The great amount of stream type, the difficulty of approach, the high cost of supplying provisions, the heavy concentration of Ribes, the apparent stubborn resistance of the species to chemicals, the complications due to beaver work, and the appearance of blister rust in several parts of the planting tend to make the contest stubborn and immediate. Looking backward, it is evident that some improvements could have been made in planning the work. A few more men last season could have cleared up everything except the Veda Lake area. As it stands, some further work is urgently necessary.

RECOMMENDATIONS FOR FUTURE WORK

It is obvious that the Still Creek region is not sanitary with respect to blister rust at present. Not all the stream type eradication area has been rechecked, and some places left for chemical work will have to be eradicated by hand if satisfactory chemical methods are not forthcoming by next spring. Veda Lake represents the worst of these. If it is to be worked by hand, a crew should establish a camp at the lake, as the time consumed in going to and from the lake from the old Still Creek planting cabin is much too great. Fortunately a good trail follows the ridge above the lake, and provisions can be packed in without great difficulty from Summit Meadows. A trail perhaps a half mile long leading from this main trail will need to be established. The ecology plots which have been left will need to be eradicated. These plots will require but little time, but some of the heavy concentrations of Ribes lacustre on both slopes near the east end of the planting will require considerable time. Lund, who was camp boss at Still Creek this season, thinks that a crew of six will be required for most of the summer to clean up the Still Creek region decently if Veda Lake is included in the eradication. Mr. Posey thinks this is essential to the job. As we

D. M. Goodding

BLISTER RUST INFECTION CENTERS

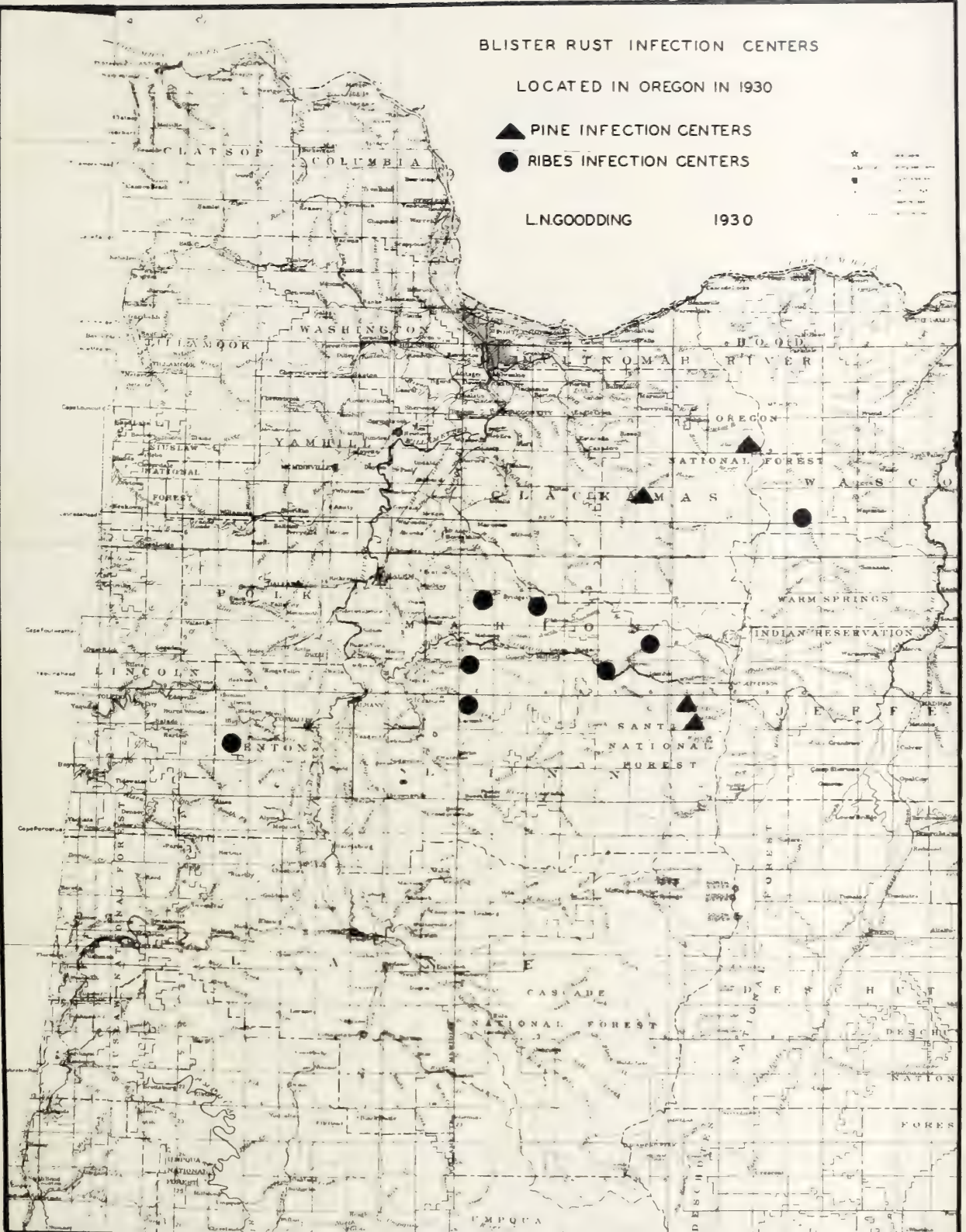
LOCATED IN OREGON IN 1930

▲ PINE INFECTION CENTERS

● RIBES INFECTION CENTERS

L.N.GOODDING

1930



Annual Report 1930
L. N. Goodding

have put our hands to the plow, we had better not look back.

TABLE NO. 1

EXPENSES FOR STILL CREEK FACILITY, 1930

| Item | Amount |
|------------------------------------|------------|
| Day labor (including cook) | \$1,344.41 |
| Salaries | 641.01 |
| Food supplies and materials | 789.19 |
| Equipment purchased, still on hand | 63.14 |
| Miscellaneous items | 82.90 |
| Transportation* | 118.02 |
| Total | \$3,038.67 |

*Transportation is for use of personally owned cars at the rate of 7¢ per mile, and of Government owned truck at 4.62 cents per mile (the calculated rate of expense per mile for gas, oil and repairs and depreciation).

TABLE NO. 2

COSTS APPORTIONED TO TYPE

| Type | Acres | Per acre | Total |
|----------------------|-------|----------|------------|
| New Brachiation* | | | |
| Stream type | 80 | \$31.85 | \$2,548.79 |
| Old burn | 424 | .60 | \$259.58 |
| Re-check eradication | | | |
| All stream type | 100 | 1.52 | \$152.00 |
| Totals | 604 | | \$3,038.67 |

*Estimating from checkers' records, 15/17 of the work on new eradication was devoted to stream type and 2/17 to old burn. The recheck required 35 man-days, at a cost of \$152.00.

have had our share in the plan, we had better not look back.

TABLE NO. 1

ANALYSIS OF STILL CRACK PROJECT, 1917

| Item | Amount |
|-------------------------------|-------------|
| Net labor (including meals) | \$1,344.41 |
| Salaries | 10,130.01 |
| Food supplies and incidentals | 782.17 |
| Equipment purchased, 1917 | |
| On hand | 63.14 |
| Miscellaneous items | 24.74 |
| Transportation* | 113.00 |
| Total | \$12,056.47 |

*Transportation is for use of personnel owned only at the rate of 74 per mile, and of Government owned truck at 4.23 cents per mile (the estimated rate of expense per mile for gas, oil and repairs and depreciation).

TABLE NO. 2

COSTS ALLOCATION TO TYPE

| Type | Amount per acre | Total |
|-----------------|-----------------|-------------|
| New Station* | 50 | \$1,344.41 |
| Stream type | 25 | 10,130.01 |
| Old type | 25 | 782.17 |
| Re-constructed | 100 | 63.14 |
| All stream type | 1.25 | 113.00 |
| Total | 200 | \$12,056.47 |

*Estimating from drawings, records, 1917 of the work on the excavation was needed to stream type was 74 per mile. The project required 35 man-days, at a cost of \$123.00.

STILL CREEK AREA
MT. HOOD NATIONAL FOREST

TABLE NO. 3

ERADICATION IN THE STILL CREEK AREA

| Species | New Eradication | | | | Re-check | | Totals | |
|-------------------------|-----------------|---------|----------|--------|-------------|--------|--------|---------|
| | Stream Type | | Old Burn | | Stream Type | | | |
| | Number | F.L.S. | Number | F.L.S. | Number | F.L.S. | Number | F.L.S. |
| <i>R. lacustre</i> | 12,478 | 268,979 | 1,345 | 30,150 | 565 | 11,458 | 14,388 | 310,607 |
| <i>R. bracteosum</i> | 2,063 | 39,522 | 4 | 780 | 740 | 4,765 | 2,797 | 45,017 |
| <i>R. triste</i> | 46 | 520 | | | 22 | 68 | 68 | 382 |
| <i>R. sanguineum</i> | 47 | 1,854 | 8 | 813 | 1 | 25 | 56 | 2,692 |
| <i>R. viscosissimum</i> | 1 | 40 | 47 | 1,437 | | | 48 | 1,477 |
| Totals | 14,635 | 310,936 | 1,404 | 33,130 | 1,326 | 16,316 | 17,367 | 360,381 |

The new eradication is equivalent to 122.2 bushes per acre, with 3,886.7 feet of live stem for the stream type, and 5.31 bushes per acre with 78.13 feet of live stem per acre for the old burn type.

Re-check eradication was limited to stream type and is equivalent to 13.28 bushes per acre, with 163.16 feet of live stem per acre.

WIND RIVER NURSERY RIBES ERADICATION, 1930

See 1928 and 1929 annual reports for work previously done on this project.

This year, a crew of six men began the work on June 18. Later the crew was reduced to five men. Work was continued until the 26th of August.

The extent of the 1930 Wind River Nursery Ribes eradication work was a complete re-check of all territory previously covered, eradication beyond the 1,000 ft. zone in new territory west of the nursery, and eradication beyond the mile zone on Martha Creek and all its branches to their heads. After this work was completed, a re-check of the newly eradicated territory was made. *R. sanguineum*, *R. bracteosum* and *R. lacustre* are the only Ribes in the vicinity of the nursery. The *R. sanguineum* was eradicated previously only to a 1,000 ft. radius from the nursery. This year, the entire hillside west of the nursery was scouted and the *R. sanguineum* removed to about 2,000 feet in this direction, or to the crest of the ridge. The *R. bracteosum* had been eradicated to a mile limit from the nursery. This year, the stream type territory (the normal habitat of *R. bracteosum*) along Martha Creek and all its branches to their heads was gone over even beyond the mile zone, and *R. bracteosum* was removed. Martha Creek and its branches offer the most likely source of blister rust infection which would affect the nursery white pines, and by having the *R. bracteosum* eradicated from this region, the chance for

[illegible][illegible]

1930 BIRTH RECORDS - 1930 BIRTH RECORDS - 1930 BIRTH RECORDS

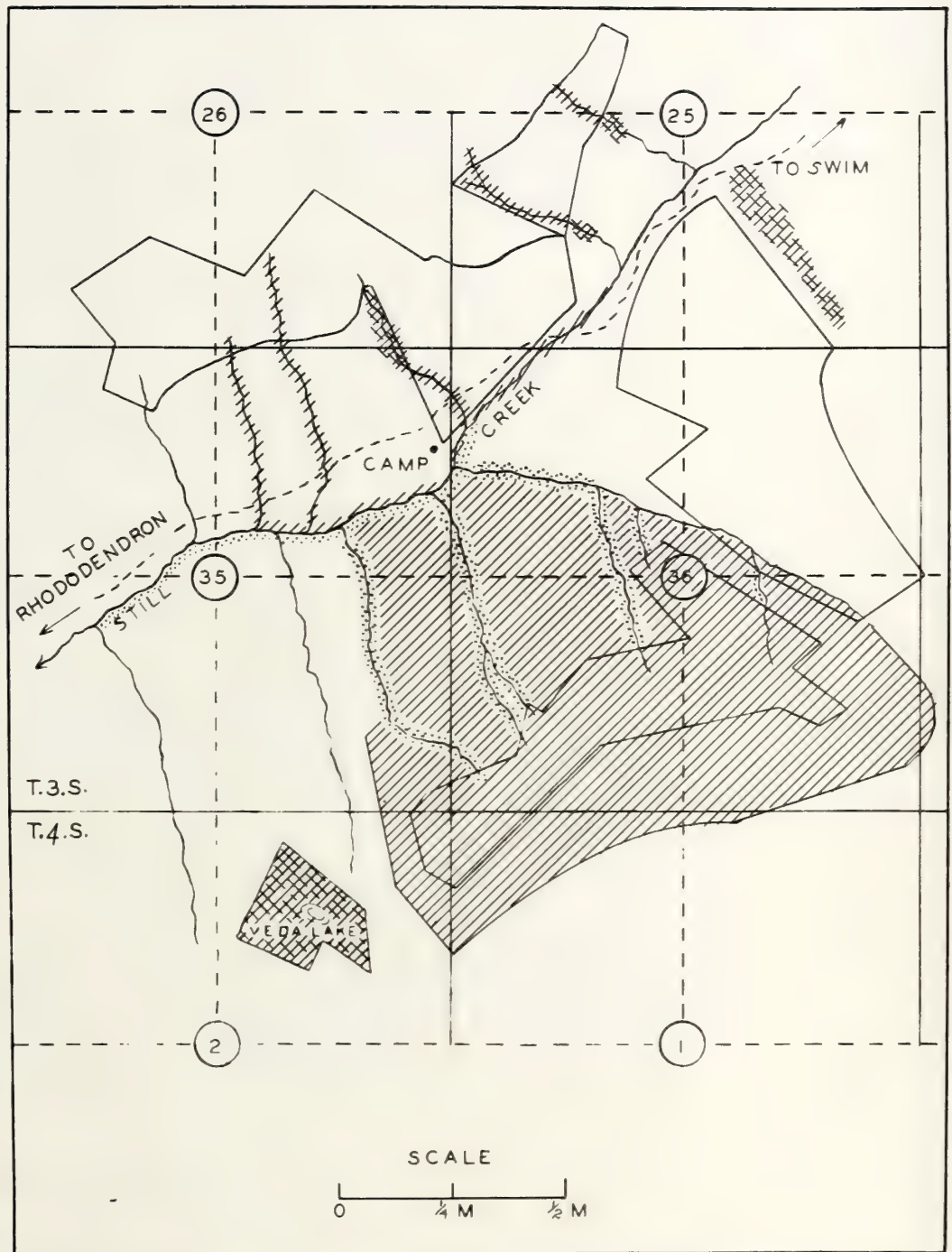
See 1988 and 1989 annual reports for work previously done on this

Posters

The crew was refused to give any information with the exception of the fact that the crew had been on the ship for some time.

[illegible]

STILL CREEK AREA
MT. HOOD NATIONAL FOREST



STREAM TYPE ERADICATION
 UPLAND ERADICATION
 STREAM TYPE RE-ERADICATION
 TO BE ERADICATED

ENCLOSED AREAS ARE WHITE PINE PLANTINGS

DATA BY E.W. LYLE OCT. 1930

TRACED BY H.F. GEIL 1931

Annual Report 1930
L. N. Goodding

infection by wind-carried spores is largely removed, for the summer winds are principally from this direction. Also, the reproduction and spread of A. bracteosum down stream into the zone of possible infection is much reduced. A. lacustre is scarce, and is found only outside the mile zone at the head of Martha Creek.

To give as nearly perfect protection of the white pines in the nursery as would be practical and possible, I suggest that a recheck of the entire area covered to date be made next year, and thereafter a bi-annual recheck twice, or as often as recheck records show that it would be advisable. This year's records show that 138 man-days of labor were required in rechecking the whole area. At this rate, it will require three and a half weeks for two three-man crews to complete an entire recheck.

The main stream of Trout Creek which flows by the nursery will need to be rechecked regularly every two years at the most, as there is an annual reseeding of the A. bracteosum from dense growths of this currant beyond the mile zone.

The presence of blister rust on pines within the 1,500 ft. zone about the nursery, near to its boundary, is but a matter of a few years. It was found this year on A. bracteosum about a mile and a half south of the nursery, and on pines about six miles west.

TABLE NO. 4

RIBES ERADICATION

| Species | Re-check | | New Erad. | | Totals | |
|----------------------|----------|--------|-----------|--------|--------|--------|
| | Number | F.L.S. | Number | F.L.S. | Number | F.L.S. |
| <u>A. bracteosum</u> | 1,903 | 4,512 | 3,992 | 67,835 | 5,895 | 72,347 |
| <u>R. sanguineum</u> | 109 | 1,899 | 107 | 1,764 | 216 | 3,663 |
| Totals | 2,012 | 6,411 | 4,099 | 69,599 | 6,111 | 76,010 |

Area covered:

Re-check eradication

Stream type - 16 1/2 miles (75 ft. wide).....150 acres
1,500 ft. zone.....186 acres

New eradication

Stream type - 6 1/2 miles (50 ft. wide)..... 37.8 acres
Hillside type..... 40.0 acres

[illegible]

to give an overall protection of the water given in the survey as would be practical and possible. I suggest that a number of the water given covered to date be made very good, and distributed in annual reduced rates, or as other an interest towards the end of the year as advised. Your year's records show that the majority of the water were required in increasing the stock area. At this rate, it will require three and a half years for the water given to be available in the survey.

[illegible]

The presence of blood in the urine is a common finding in the early stages of the disease. It is usually accompanied by a moderate amount of albumin and a few leukocytes. The urine is usually of a pale yellow color and has a specific gravity of 1.010 to 1.020. The pH is usually slightly acid. The sediment is usually scanty and consists of a few leukocytes and a few erythrocytes. The sediment is usually more abundant in the early stages of the disease and becomes scanty as the disease progresses.

4. 4. 4. 4. 4.

DOI: 10.1002/col.10042

[illegible]

ALB COVERED

Stream type - 64 miles (50 ft. wide)..... 27.8 miles
New radiation
1,300 ft. zone..... 1.5 miles
Stream type - 164 miles (75 ft. wide)..... 1.0 miles
Re-check radiation

TABLE NO. 5

RATE OF ERADICATION

| Month | Re-check
Eradication | | New
Eradication | |
|--------|-------------------------|----------|--------------------|----------|
| | Stream | 1500 ft. | Stream | Hillside |
| | Type | Zone | Type | Type |
| | Man- | Man- | Man- | Man- |
| | Days | Days | Days | Days |
| June | 18 | 18 | 32 | 2 |
| July | 36 | | 109 | |
| August | 63 | 10 | | 16 |
| Totals | 105 | 33 | 141 | 18 |

TABLE NO. 6

COST OF ERADICATION

| Type | Acres | Per
Acre | Total |
|-----------------|-------|-------------|------------|
| New eradication | | | |
| Stream type | 37.8 | \$18.37 | \$ 694.43 |
| Hillside type | 40.0 | 2.22 | 88.80 |
| Re-check | | | |
| Stream type | 150.0 | 3.45 | 517.15 |
| 1500 ft. zone | 186.0 | .87 | 161.82 |
| Totals | 413.8 | | \$1,462.73 |

EXPENSES

| Item | Amount |
|--------------------------------------|------------|
| Salaries | \$612.90 |
| Day labor | 298.39 |
| Meals | 515.00 |
| Transportation* | 25.59 |
| Equipment (tools,
mattocks, etc.) | 23.70 |
| Total | \$1,475.58 |

*Transportation was by Government truck, and the average rate of car expense during the summer (gas, oil, repairs and depreciation, at 4.42 cents per mile) was used in calculating the expense of transportation. Mileage was 584.

TABLE NO. 5
 RATE OF ERADICATION
 The rate of eradication is defined as the number of cases of disease eradicated per 100 cases of disease existing at the beginning of the year.

| Year | 1914 | | 1915 | | 1916 | |
|------|--------------|------|--------------|------|--------------|------|
| | Man-
Days | Type | Man-
Days | Type | Man-
Days | Type |
| 1914 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1915 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1916 | 100 | 100 | 100 | 100 | 100 | 100 |

TABLE NO. 6
 COST OF ERADICATION
 The cost of eradication is defined as the total cost of the work done in eradicating the disease.

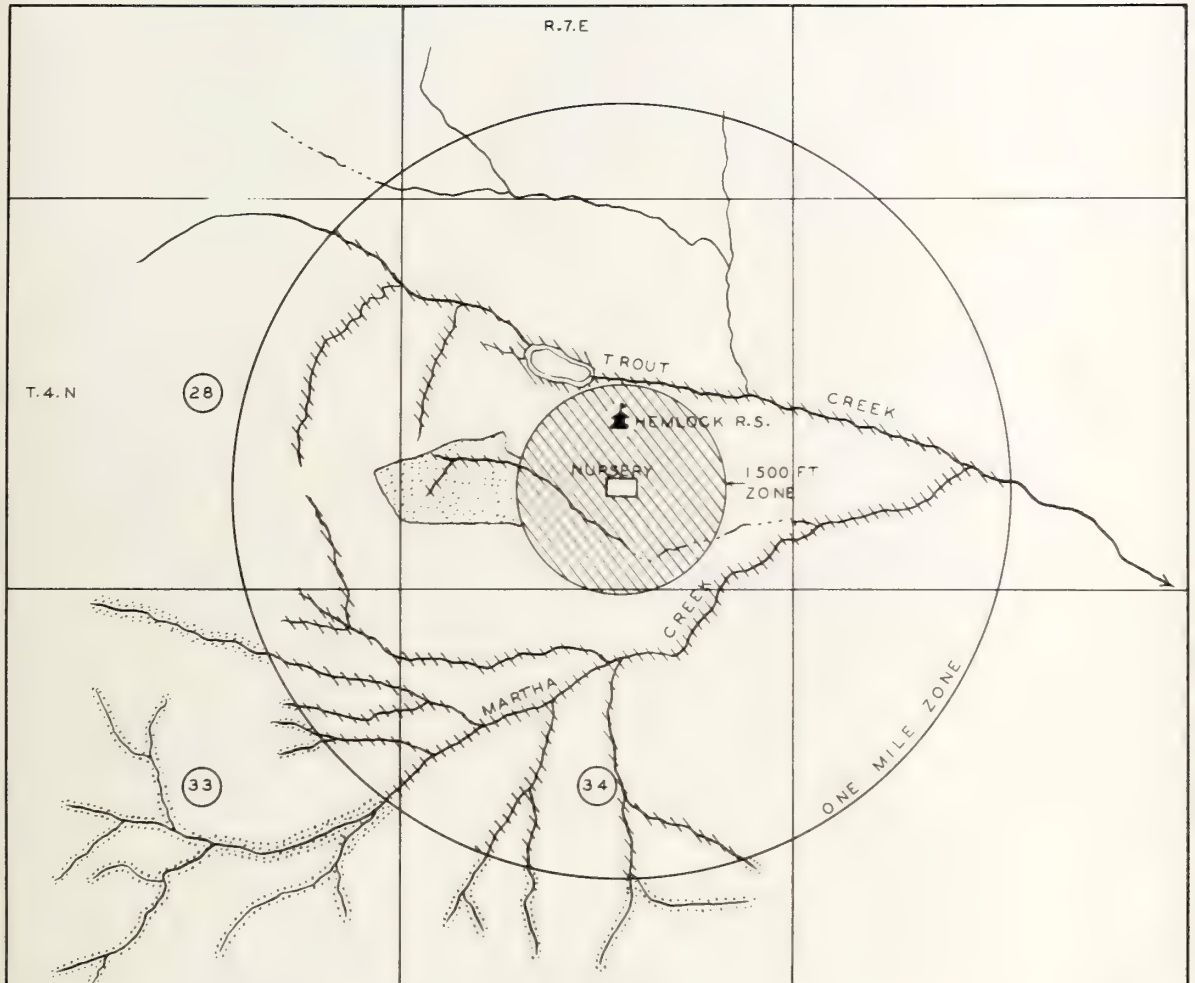
| Year | 1914 | | 1915 | | 1916 | |
|------|--------------|------|--------------|------|--------------|------|
| | Man-
Days | Type | Man-
Days | Type | Man-
Days | Type |
| 1914 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1915 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1916 | 100 | 100 | 100 | 100 | 100 | 100 |

TABLE NO. 7



| Year | 1914 | | 1915 | | 1916 | |
|------|--------------|------|--------------|------|--------------|------|
| | Man-
Days | Type | Man-
Days | Type | Man-
Days | Type |
| 1914 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1915 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1916 | 100 | 100 | 100 | 100 | 100 | 100 |

TABLE NO. 8
 SUMMARY OF RESULTS
 The summary of results is defined as the total number of cases of disease eradicated and the total cost of the work done in eradicating the disease.



WIND RIVER EXPERIMENT STATION AREA



ERADICATION

-  UPLAND TYPE
-  STREAM TYPE BEYOND ONE MILE

RE-ERADICATION

-  ALL TYPES WITHIN 1500 FEET
-  STREAM TYPE WITHIN ONE MILE

SCALE 0 $\frac{1}{4}$ M $\frac{1}{2}$ M

FIELD DATA BY E.W. LYLE OCT. 1930.

TRACED BY H.F. GEIL FEB. 1931.

Annual Report 1930
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The following species of white pine are now in the area being
at Wild River Nursery:

| | | |
|------------------------------|------------|--------|
| <i>Pinus strobus</i> | (1-2)..... | 28,000 |
| <i>P. lambertiana</i> | (1-2)..... | 8,000 |
| <i>P. flexilis</i> | (1-2)..... | 4,000 |
| <i>P. monticola</i> | (2-2)..... | 6,000 |
| <i>P. monticola</i> | (1-2)..... | 22,000 |
| <i>P. monticola</i> | (2-0)..... | 14,000 |
| <i>P. strobiformis</i> | (1-1)..... | 8,000 |
| <i>P. peuce</i> | (1-0)..... | 1,000 |

URGENT SANITATION, PLANT ARBORETUM

In 1929, the sanitation of the heavy Arboretum was undertaken. 206 acres were covered by a crew, and 1,581 bushes were removed. It was thought best to cover the ground in the 150-ft. zone again this year. Accordingly, a 6-man crew under the direction of Albert Ernst of the School of Forestry, Oregon State College, did the work. The crew and foreman were directed and paid by the School of Forestry. No records were kept of the results of the work. It was done on week ends, and totaled 33 man-days. Walter Lund, who was crew foreman in 1928 in the initial eradication, gave the crew its instructions and supervised the work the first day. He was paid by our office.

On October 22, 1930 Aldon Lyle spent one day in checking some of the land from which many ribes had been removed. He found 37 *R. sanguineum* bushes, totaling about 634 feet of live stem. These bushes were in a heavy growth of poison ivy, most of the leaves of which had fallen exposing the *R. sanguineum* which had not shed its leaves.

The poison ivy in this area is the fly in the ointment, as those working in it are almost certain to experience severe poisoning. The result is that the poison ivy areas are never worked as well as they should be, and most of the ground not under cultivation or in dense timber is heavily grown up to ivy.

As the consequence of this check, it does not seem that the nursery should be given a permit to grow pines at the present time.

SCOUTING FOR BLISTER MOSC IN OREGON, 1930

In this report, consideration is not given Canyon Creek, Eagle Creek, Rhododendron or other sections in which blister rust is known to be common or in which special work was done. It is felt also that infection on currants, except in localities where its presence shows distant spread over that recorded last year or where it is in association with white pine, is not significant; consequently no reference is made to it. An effort has been made to locate definitely many points where pines and ribes are

L. H. ...

The following species of white flies are now in the seed bank at the River Works:

| | | |
|-----------------------------|------------|--------|
| <i>P. persea</i> | (1-0)..... | 1,000 |
| <i>P. citrifoliae</i> | (1-0)..... | 1,000 |
| <i>P. mangiferae</i> | (1-2)..... | 14,000 |
| <i>P. moniliola</i> | (1-2)..... | 23,000 |
| <i>P. mangiferae</i> | (1-2)..... | 2,000 |
| <i>P. mangiferae</i> | (1-2)..... | 4,000 |
| <i>P. mangiferae</i> | (1-2)..... | 2,000 |
| <i>P. mangiferae</i> | (1-2)..... | 2,000 |

CURRENT ESTIMATES, WHITE FLIES

In 1932, the estimation of the heavy infestation was estimated. 300 acres were covered by a crop, and 1,500 bushes were removed. It was thought best to cover the ground in the 1930-31 season again this year. Accordingly, a 3-man crew under the direction of Albert Smith of the School of Forestry, Oregon State College, did the work. The crew and foreman were directed and paid by the amount of foreman. In 1932, were kept of the results of the work. It was then no more work, and located 33 man-days. Walter Smith, who was then foreman in 1932 in the initial excavation, gave the crew the instructions and supervised the work the first day. He was paid by our office.

On October 22, 1932, when this report was sent to the Bureau of Entomology and Plant Quarantine, the land from which the flies had been removed. He found 27 *P. mangiferae* males, including about 100 flies of live flies. These males were in a heavy growth of poison ivy, most of the leaves of which had fallen exposing the *P. mangiferae* which had not been removed.

The poison ivy in this area is the fly in the autumn, as those working in it are almost certain to experience severe poisoning. The result is that the poison ivy areas are never touched as well as that should be, and most of the ground not under cultivation or in some other way is heavily grown up to ivy.

As the consequences of this class, it has not been that the nursery should be given a permit to grow plants at the present time.

RECOMMENDATIONS FOR WHITE FLIES

In this report, consideration is not given to the white flies, but to the white flies, which are known to be common or to which special work was done. It is felt that the white flies, except in the areas where the white flies were found, are not that common, but that they are found in the areas where the white flies were found. It is not recommended that any other work be done in the areas where the white flies were found, but that the areas where the white flies were found be kept under close and close watch.

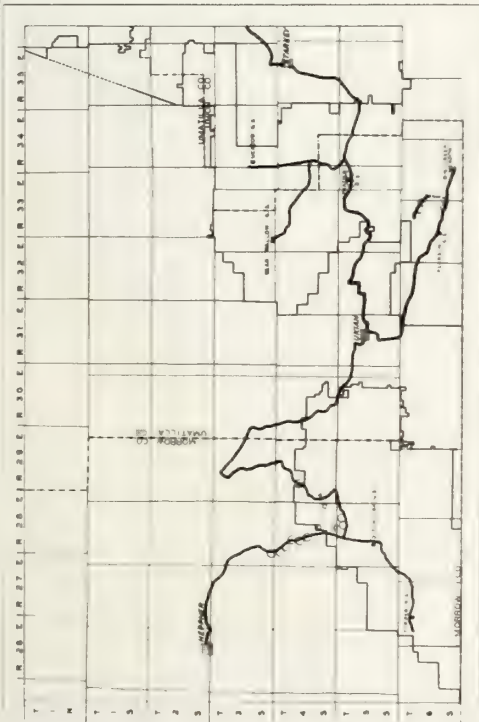
SCOUT MAP OF N.E. OREGON AND S.E. WASHINGTON

SCALE
0 MILES

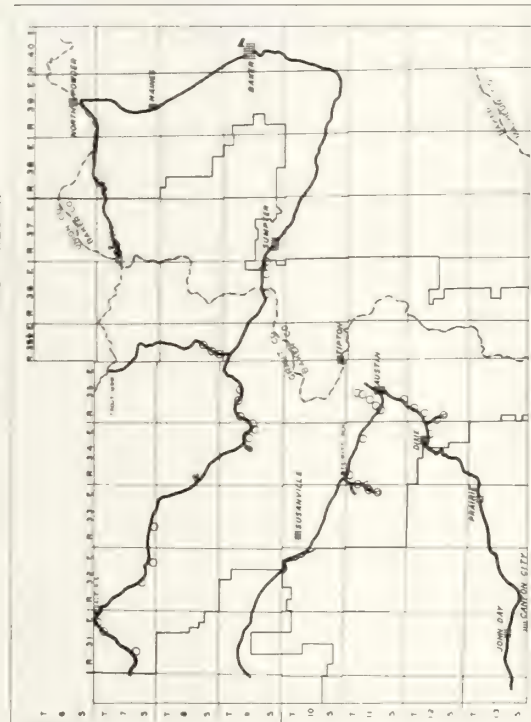
FIELD DATA BY LYLE AND HINCKLEY—MAP BY L. N. GOODING, NOV. 15, 1930—TRACED BY FF STAT., FEB. 2, 1931.

RIBES PETIOLARE, PINUS MONTICOLA, PINUS ALBERTIANA IN ASSOCIATION @ ROUTE TRAVELED.

WILLAMETTE MERIDIAN



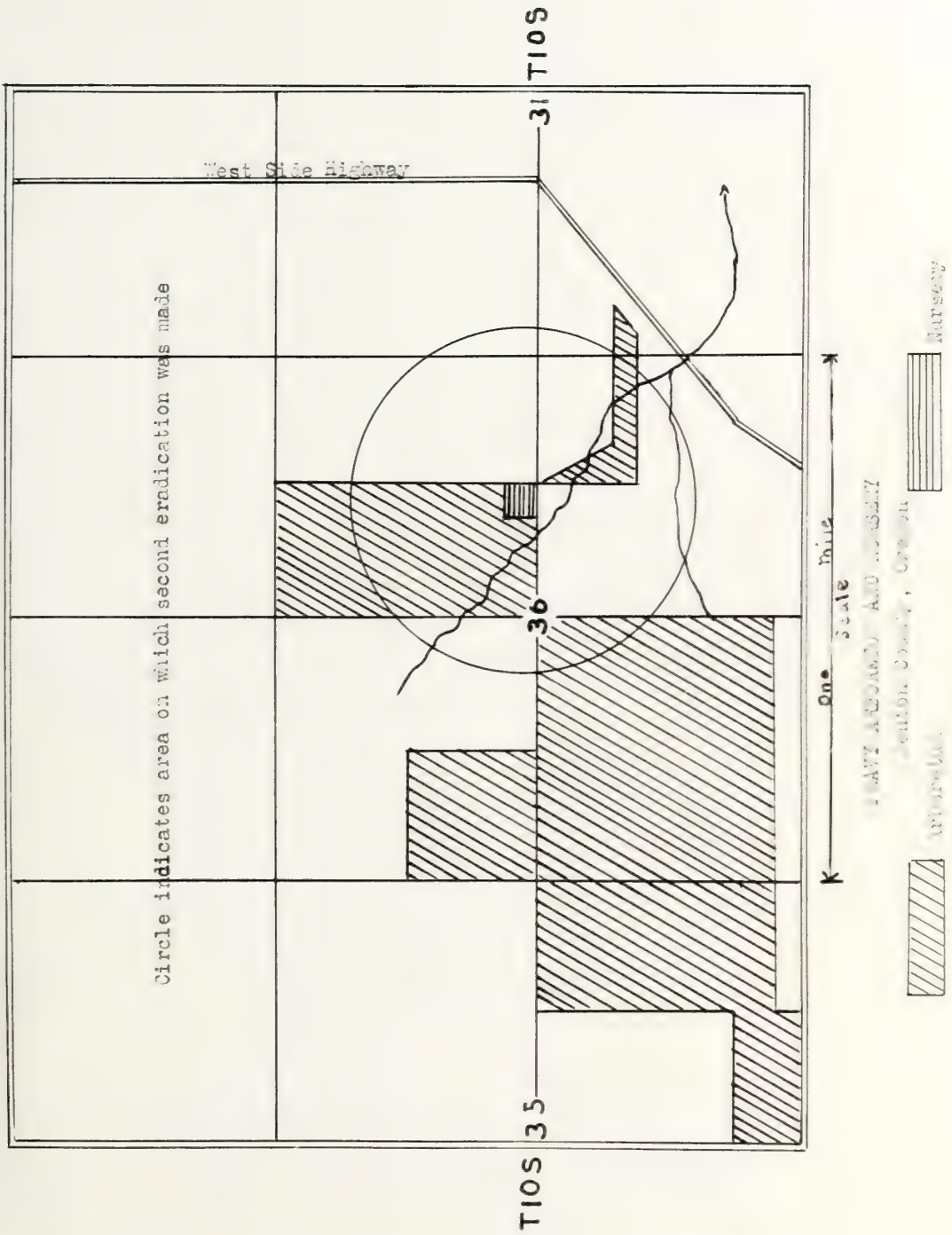
UMATILLA NATIONAL FOREST REGION



WHITMAN NATIONAL FOREST REGION

UMATILLA AND WALLOWA NATIONAL FOREST REGIONS

Annual Report 1930
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associated, and in some places such as along the coast in Curry County definite location has been given to patches of A. arctosorum readily accessible for inspection.

A careful survey was made of the Still Point plateau.

Because of the heavy infection found in the Cochran region last year, considerable scouting was done in that region during the spring with hope of locating the source of the aecial spread. No places were located. Similarly, the region above Kistacada was scouted as far back as passable roads permitted. While planted white pines are rather common there, in no place was a likely association with *Aibes* found.

The trees at the Peavy Arboretum were examined carefully. The rust has never been found in that locality to date.

Following a normal expectation of finding blister rust east of the mountains where A. petiolare is associated with pines and where slight *Aibes* infection was found last year, the region east of the crest of the Cascades in the Mt. Hood Forest and south, was carefully scouted. With the exception of a single tiny spot on a leaf of A. petiolare, no infection of any kind was found there until fall. The single leaf was found June 26, on Bear Springs Creek. No more infection was found there until October 2, when by a most painstaking examination along the stream for a mile two locations were found; one, a single leaf, and one consisting of six leaves. This is an indication of the very slight intensification which took place in this region. Indications for all of western Oregon are much the same, though some new infection centers were found where conditions seemed more favorable, and where moderate intensification had taken place.

In August a scouting trip was made to southwestern Oregon, but nothing was found. It was felt at the time that infection might be located in a month or so, but this too failed to materialize.

Considerable scouting was done in the fall at the headwaters of streams in the Cascade region to locate pine infections. This work resulted in finding infected pines at the head of the south fork of Roaring River in Clackamas County and near Independence Ranger Station in Linn County. The last named location is the farthest point south at which pine infection has been located.

Scouting more intensive and more extensive than has been undertaken previously was carried on in northeastern Oregon. While no infection was found, many localities in which western white or white-bark pine grows in association with A. petiolare were found. The accompanying maps show the location of these associations.

The following table reveals some of the results of scouting done. Where pine infection was found, an attempt was made to determine the age of the wood infected, but study plots were not established at any of the points.

associated, and in some places with an almost complete absence of the disease. The location has been given as near the mouth of the Columbia River accessible for inspection.

Because of the heavy infection found in the Columbia region last year, considerable searching was done in that region during the spring with hope of locating the source of the rapid spread. No signs were located. Finally, the region above Vancouver was searched as far back as possible roads permitted. This limited this place of origin. In no place was a likely association with signs found.

The signs at the heavy infection were examined carefully. The first has never been found in that locality to date.

Following a normal inspection of British Columbia last year of the mountains where the disease is associated with signs and where slight signs infection was found last year, the region west of the mouth of the Columbia in the Mt. Hood Forest and north was carefully searched. With the exception of a single sign seen on a trail of the disease, no infection of any kind was found there until fall. The single sign was found June 20, on Bear Springs Creek. No more infection was found until October 5, when a most extensive examination along the stream for a mile two locations were found: one, a single sign, and one consisting of six leaves. This is an indication of the very slight infection which took place in this region. Infection for all of western Oregon are much the same. Infection from one location source was found where conditions seemed more favorable, and where suitable infection had taken place.

In August a hunting trip was made to southwestern Oregon, but nothing was found. It was felt at the time that infection might be located in a month or so, but this too failed to materialize.

Considerable searching was done in the fall at the headwaters of streams in the Cascade region to locate the infection. This work resulted in finding infected places at the head of the mouth fork of Klamath River in Clatsop County and near Independence Canyon. In the latter country, the first found location is the farthest point south at which pine infection has been located.

Resulting more intensive and more extensive signs have been under- taken previously was carried on in southwestern Oregon. This in infection was found, many locations in which western white pine was associated with the disease were found. The accompanying map shows the location of these associations.

The following table reveals some of the results of searching these pine infection was found, an attempt was made to determine the age of the wood infected, but exact dates were not established at any of the points.

careful survey was made of the Still Creek p...
icate that eradication was begun none too so...
e is almost sure to occur in parts of the p...
work that has been done. Notes follow the...
ections in this region, giving some signific...

1. In the case of a company which is a member of a group, the company shall be treated as a separate entity for the purposes of the provisions of this Act, and shall not be treated as a member of the group for the purposes of the provisions of this Act.

TABLE NO. 7

RECORD OF SLEISTEN RUST INFECTIONS ON BIRDS IN OREGON,

1930

| County | Region | T. | R. | S. | Host | Number | | Per Cent Infected Leaves | Per Cent Infected Surface | | | Acco- ciation | Inspector | Date
1930 |
|---------|-------------------|-----|-----|----|-----------|------------|--------------|--------------------------|---------------------------|-----------|------------|---------------|----------------|--------------|
| | | | | | | Exam- ined | In- fec- ted | | Ure- dinia | Te- lisia | Ne- crotic | | | |
| Eastern | Mary's Pass | 122 | 73 | 23 | A. bract. | 50 | 2 | 10 | 0 | 100 | 0 | Very poor | Slackley | 9-8 |
| | Silver Cr. Falls | 88 | 12 | 11 | A. bract. | 25 | 1 | 1 leaf | 0 | 100 | 0 | Very poor | Slackley | 9-8 |
| | Copper Creek | 83 | 35 | 19 | A. bract. | 70 | 1 | 2 | 0 | 100 | 0 | Excellent | Colman | 9-15 |
| | Breitenbush | 93 | 72 | 20 | A. bract. | 50 | 1 | 1 | 0 | 100 | 0 | Good | Goodling | 9-5 |
| | Breitenbush River | 23 | 67 | 29 | A. bract. | 50 | 1 | 5 | 0 | 50 | 50 | Very poor | Slackley | 9-3 |
| Illino | Petralt | 109 | 52 | 6 | A. bract. | 100 | 5 | 10 | 0 | 100 | 0 | Very poor | Goodling | 9-2 |
| | Independence | 113 | 72 | 10 | A. bract. | 50 | 2 | 5 | 0 | 100 | 0 | Good | Lyle, Goodling | 10-11 |
| | Independence | 113 | 72 | 10 | A. ang. | 2 | 2 | 80 | 0 | 75 | 25 | Excellent | Lyle, Goodling | 10-11 |
| | Thomas Creek | 109 | 11 | 5 | A. bract. | 50 | 2 | 2 | 0 | 100 | 0 | Poor | Slackley | 9-30 |
| | Koering River | 113 | 18 | 6 | A. bract. | 100 | 2 | 2 | 0 | 100 | 0 | Poor | Slackley | 9-30 |
| Wasco | Pear Springs Cr. | 58 | 101 | 23 | L. pet. | 200 | 1 | 1 leaf | 100 | 0 | 0 | Poor | Goodling | 6-25 |
| | Dear Springs Cr. | 58 | 101 | 23 | A. pet. | 400 | 2 | 0.1 | 0 | 75 | 25 | Poor | Goodling, Lyle | 10-3 |

1871
1872

[illegible]

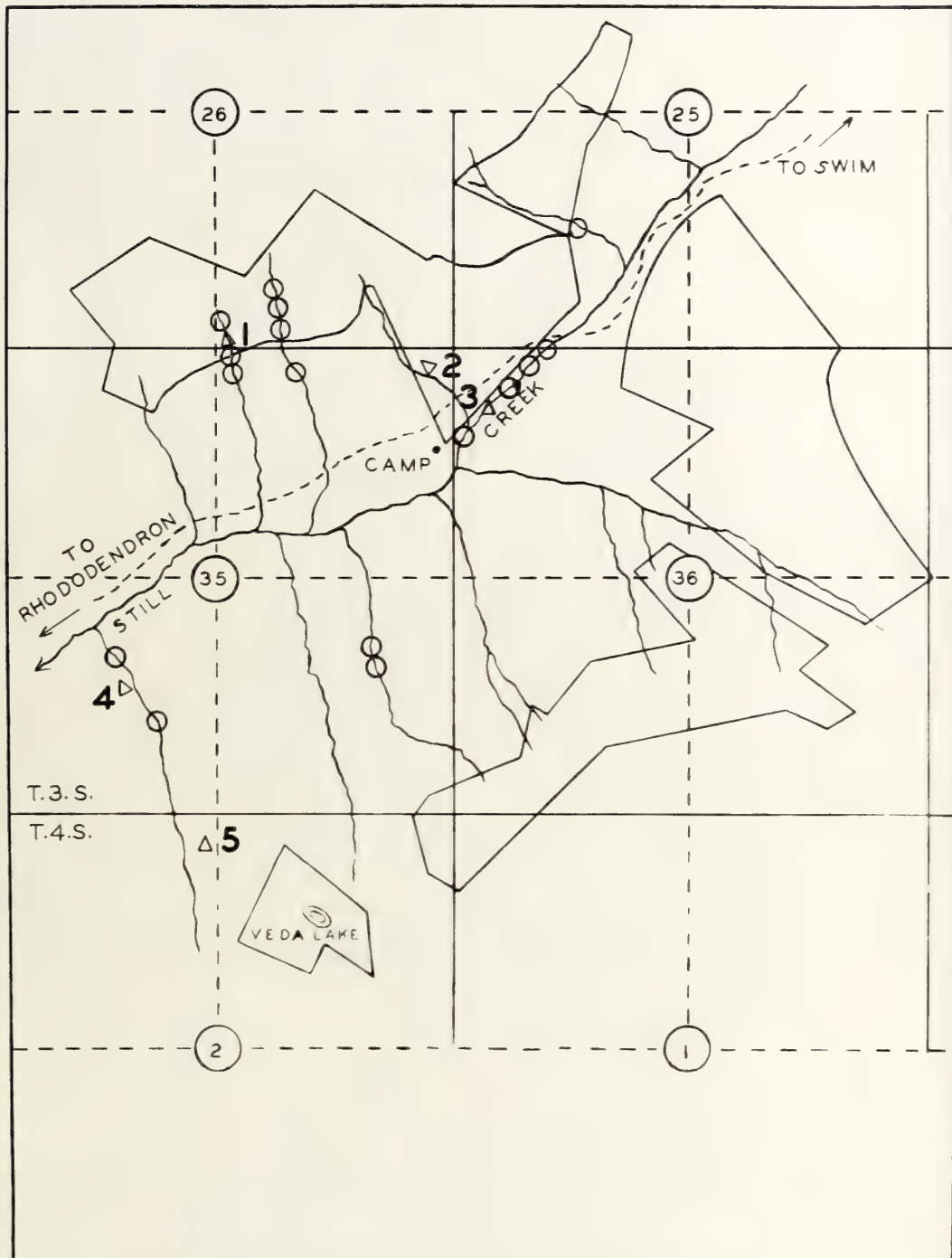
TABLE NO. 8

RECORD OF BLISTER RUST INFECTIONS ON PINES IN OREGON, 1930

| County | Region | T. | R. | Sec. | Host | Number | | Date | Inspector | Remarks |
|-----------|-------------|-----|----|------|--------------|--------|---------------|-------|---------------|--------------------------------------|
| | | | | | | Armed | In-
fected | | | |
| Clackamas | Still Creek | 33 | 81 | 26 | J. monticola | 15 | 3 | 8-28 | Snider, Lyle. | Infected 1925 |
| | | 33 | 81 | 26 | " | 10 | 2 | 8-7 | Gooding | Infected 1925 |
| | | 33 | 81 | 35 | " | 25 | 1 | 8-7 | Colgan, Locke | Infected 1925 |
| | | 33 | 81 | 35 | " | 100 | 10 | 9-5 | Goodall | Infected 1925 |
| Hosking | River | 48 | 81 | 2 | " | 15 | 1 | 9-7 | Lyle | Infected '20, '26 |
| | | 53 | 81 | 7 | " | 150 | 1 | 9-5 | Colgan | '26, '27 |
| | | 63 | 81 | 7 | " | 100 | 1 | 9-5 | Land, Dickey | Infected 1925 |
| Minto | Creek | 112 | 71 | 26 | " | 50 | 2 | 9-5 | Land, Dickey | Infected 1925 |
| | | 112 | 71 | 26 | " | 300 | 15 | 10-11 | Lyle, Gooding | Very heavy. Infected 1925 or before. |

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STILL CREEK AREA
MT. HOOD NATIONAL FOREST



BLISTER RUST INFECTION 1930

Δ=ON PINE O=ON RIBES

SCALE 0 1/4 M 1/2 M

DATA BY E.W.LYLE OCT.1930

TRACED BY H.F.GEIL FEB.1931

Annual Report 1930
L. W. G. 1930

OBSERVATIONS ON STILL CALM WHITE PINE PLANTATIONS, 1930

1. Ten white pines were found to be infected in this area along the stream and as far as 75 feet from the creek bed. The infected wood on the trees indicates that they became infected in 1926 and 1927. This stream was re-eradicating during September, 1928.
2. One tree was found to be infected. The stream has not been completely eradicated. Some R. lacustre and R. bracteatum remain.
3. Three infected pines were found. The stream has since been re-checked. The infection probably occurred during 1927.
4. Two white pines were infected on 1926 wood. No eradicating of pines has been done along this stream. R. bracteatum and R. lacustre are abundant.
5. One white pine infected on 1926 wood. It is about 200 feet from the stream, where R. lacustre and R. bracteatum occur.

ECOLOGICAL STUDIES

During 1930, Mr. Stipe followed up the ecological work begun in previous years on collected data on plots already established. In many cases, data did not show anything more than the report in the first report; hence, each plot is discussed on the basis of the first report, and any additional data secured in 1930 were here appended.

Several plots are closed, either because the required information has been secured, or because the plot has failed to develop or has been destroyed.

PARIAUT REGION, CHATEAU NATIONAL FOREST, CANADA

Plot I. In plot I many seedlings were observed at the beginning of the plot study. These seedlings grew fairly well for some years. During 1930 it was observed that practically all the pines had been smothered out by the growth of annual herbs, largely grasses. This was a sufficiently open place to give the grasses and annual herbs a foothold. The results would indicate that under certain conditions, grasses and herbs may play an important role in suppressing white seedlings that come in after eradication.

Plot II. In this plot, the rapid growth of willows seemed to be suppressing the pines materially, although not killing them.

Plot III. No A. crinitum seedlings are yet appearing. The plot is probably too shady to allow germination of seeds of this species.

ORIGIN OF THE WHITE PINE

1. The white pine was found to be infected in this area along the stream and on the 20 foot low stream bed. The infected wood of the trees indicated that some disease infection in 1911 and 1912. The stream was re-estimated during September, 1912.

2. The tree was found to be infected. The stream bed and bank were closely examined. Some B. fasciata and B. ponderosa found.

3. Three infected trees were found. The stream was since been re-checked. The infection probably occurred during 1912.

4. Two white pines were infected in 1912 wood. An examination of the stream has been since this stream. B. ponderosa and B. fasciata were abundant.

5. One white pine infected in 1912 wood. It is about 40 feet from the stream, where B. fasciata and B. ponderosa occur.

ECOLOGICAL STUDIES

During 1912, the high infection of the white pines with B. fasciata in previous years was collected data on white pine infection. In many cases, data did not show infection, but was noted in the 1912 report. Some data is discussed on the basis of the 1912 report, and any additional data secured in 1912 will be reported.

Several pines are shown, either because the reported infection has been secured, or because the pine has failed to develop as has been destroyed.

FOREST SERVICE, CHAS. E. SMITH, FOREMAN, OREGON

1. In 1912 I saw seedlings were observed at the beginning of the pine study. These seedlings were fairly well two years. During 1912 it was observed that practically all the seed had been destroyed and by the growth of several years, largely destroyed. This was a sufficient time to give the stream and stream bed a four-foot. The stream would indicate that under certain conditions, B. fasciata and B. ponderosa may give an infection to the seedlings which seedlings that come in after eradication.

2. In 1912, the white pine growth of white pines was in an indication that the seedlings, although not killing them.

3. In 1912, the B. ponderosa seedlings are not reported. The 1912 is probably too small to allow eradication of seeds of this species.

Plot IV. Closed. Individual data not taken on plants possible.

Plot V. No individual plant data taken in 1930.

Plot V-a. Same as indicated in 1929 report. The conclusions in 1929 can be taken as the final conclusions for this plot study, as no further developments are likely to result. Closed.

Plot VI. Coniferous shade on this plot is gradually increasing, and a slight effect can be noticed on the Ribes. They seem somewhat less thrifty, and show less new growth.

Plot VI-a. This plot was destroyed by vandals who pulled up all the numbered stakes and threw them away. Closed.

Plots VII and VIII. No seedlings of Ribes were found on these plots in 1930. Closed.

Plot IX. No seedlings Ribes were found here during 1930. The conclusions from the plot are essentially as in the 1929 report.

Plot X. Nothing new has developed since the 1929 report.

During the period covered by this study, the *P. binominatus* show no invasion of the eradicated territory, and very little resprouting from old crowns or missed plants.

Plot XI. Same as 1929. Sub-plot F showed good continued growth of Ribes on lightly burned plot, with no Ribes on sub-plots A or B.

Plot XII. No seedling Ribes were found here. This plot is doubtless in too shady a location to expect any Ribes seedlings to appear. See 1929 report.

Plot XIII. Not checked by individual plants in 1930. Should be so checked in 1931.

Plot XIV. Closed.

Plot XV. No Ribes seedlings were found here. Disturbance of the duff alone, in this case, was not sufficient to stimulate dormant Ribes seeds to grow.

Plot XVI. Several small seedlings were found on disturbed places in this plot, which were marked for observation next year. This plot differed from Plot XV by being more open to sunlight.

Plot XVII. Individual data not taken on plants this year, but should be taken in 1931 if possible.

Plot XVIII. A few R. erythrocarpum plants were coming in on this plot, one from a missed crown, and three or four from missed fragments under a log.

STILL CREEK AREA

The ecology work of the Still Creek area is closed. Because of the rapid invasion of blister rust here, it has not been deemed advisable to leave any patches of Ribes within the planting; hence, all ecology plots in this area have been abandoned.

RIBES COLLECTIONS FOR CHEMICAL INVESTIGATIONS

Mr. Sipe spent much time during the period from June 15 to August 1 in collecting material for some of Mr. Offord's experiments. First, a collection was made of R. erythrocarpum for histological work. This was preserved in alcohol, and stored for shipping. At the same time collections were begun for starch analyses. These consisted of definite amounts of roots, leaves and stems of the current season, one year old and older stems of R. cereum and R. erythrocarpum. After collecting each species at 14-day intervals through the period, all material was later shipped to Mr. Offord's office in Berkeley.

EXPERIMENTAL RIBES GARDEN

Near the close of the season collections of Ribes from southern Oregon were made for use in experimental blister rust inoculation work. In the vicinity of Rhododendron, where heavy infections of blister rust on white pines have already been found, an area was cleared and prepared for the garden. During September Blackley and Sipe made a trip to southern Oregon and collected 60 to 70 good plants of the most important Ribes species of that region, packed them in wet moss and brought them back to Corvallis. There they were left in storage for some time, but were kept moist. The Ribes species collected were:

- R. erythrocarpum from Crater National Park
- R. hallii from Union Creek, Crater National Forest
- R. binominatum from Union Creek, Crater National Forest
- R. cruentum from Prospect
- R. klamathense from Prospect

1901 XVII - Individual data not found on plants this year, but should be taken in 1901 if possible.

1902 XVIII - A few *A. strimmarum* plants were noted in the field, one from a mixed group, and others from mixed groups. Under a log.

1903 XIX

The majority were of the *strimmarum* type in 1903. Because of the rapid increase of mixed this year, it has not been deemed advisable to leave any number of lines within the *strimmarum* group, but all *strimmarum* plants in this year have been identified.

1904 XX

All these species were taken in 1904. The first two lines in August 1 in collection material for some at Mr. Ott's experimental. First, a collection was made of *A. strimmarum* for biological work. This was preserved in alcohol, and stored for biological work. The same time collections were made for other species. These consisted of definite numbers of each, leaves and stems of the current season, one year old and older stems of *A. strimmarum*. After collecting each species in 1904, the material was stored in alcohol. All material was later added to Mr. Ott's collection in 1904.

1905 XXI

From the close of the season collections of 1905 from southern Oregon were made for use in experimental studies. The lines were. In the vicinity of Medford, where many collections of plants from the white pine have already been taken, an area was cleared and prepared for the garden. During September 1905 and 1906 a trip to southern Oregon and collected in 1905. The most important lines species of that year, which were in wet moss and brought them back to Corvallis. There they were left in storage for some time, but were kept moist. The lines species collected were:

- 1. *A. strimmarum* from Corvallis 1905
- 2. *A. strimmarum* from Corvallis 1905
- 3. *A. strimmarum* from Corvallis 1905
- 4. *A. strimmarum* from Corvallis 1905
- 5. *A. strimmarum* from Corvallis 1905
- 6. *A. strimmarum* from Corvallis 1905
- 7. *A. strimmarum* from Corvallis 1905
- 8. *A. strimmarum* from Corvallis 1905
- 9. *A. strimmarum* from Corvallis 1905
- 10. *A. strimmarum* from Corvallis 1905

R. velutinum

R. velutinum

A. velutinum

]

Next

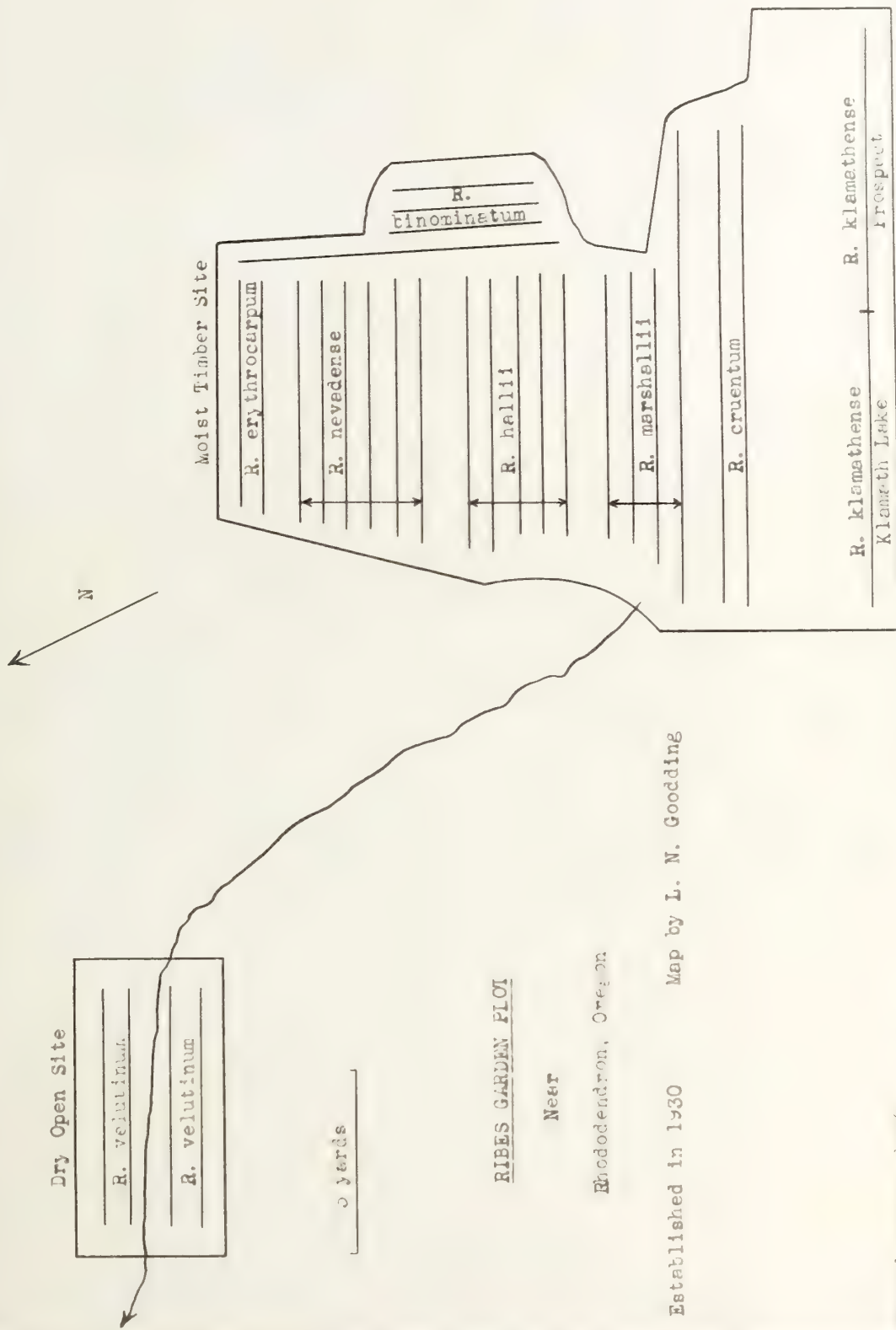
Rhododendron, Ore: m.

Established in 1930
Map by L. N. Gooding

Map by L. N. Goodding

Annual report 1906
T. W. Gooding

E. H. Gooding,



R. klamathense from Klamath lake shores
R. velutinum from near Klamath Lake
R. marshallii from near Oregon Caves
R. nevadense from near Oregon Caves

These Ribes were later taken by Gooding and Lyle and planted in the Ribes garden near Rhododendron.

The plants are all southern Oregon species, and have not yet been subjected to blister rust infection in the field. There are 50 or 60 excellent plants of R. sanguineum next to the garden plot. The susceptibility of this species has been quite definitely established, and it can be used for comparison with the other species. The plan is to carry out artificial inoculation experiments on each species, to determine as far as possible the susceptibility of each. Should there be sufficient growth during the spring of 1931, this work will be begun at that time by the Office of Forest Pathology under Dr. Leckman's direction.

RIBES SEED COLLECTIONS AND DISTRIBUTIONS

During the 1930 season a number of seed collections were made of various species of currants and gooseberries. Part of the seeds were turned over to D. R. Miller at Moscow for germination experiments. The rest were placed in the hands of the Department of Horticulture, Oregon State College.

The following is the complete list of seed collections made during the season: R. sanguineum, R. cereum, R. aureum, R. petiolare, R. klamathense, R. velutinum, R. cognatum, R. goodingii, R. glutinosum, R. irriguum, R. binominatum, R. divaricatum and R. niveum. Seeds of all these except R. petiolare, R. divaricatum and R. niveum were sent to Miller. Seeds of all except R. sanguineum, R. cereum, R. aureum and R. glutinosum were supplied to the Horticulture Department.

Seeds from 1927 collections of the following species were also sent to Miller for his experiments: R. aureum, R. bracteosum, R. cereum, R. erythrocarpum, R. petiolare, R. sanguineum, R. binominatum, R. cruentum, R. klamathense, R. lobbii, R. marshallii, R. niveum and R. velutinum. These seeds had been dried, and some of them were used by the Oregon State College Department of Horticulture with poor success last year. The collections of last season were not allowed to dry out and better results are expected of them.

RIBES BUSH COLLECTIONS

Besides the collections made for the Ribes garden at Rhododendron, plants of several species were collected and turned over to the Horticulture

- Novelists from New Orleans
- Novelists from New Orleans
- Novelists from New Orleans
- Novelists from New Orleans
- Novelists from New Orleans

These films were later found by Douglas and Lyle and placed in the Alice Farnes West collection.

The plants are all members of the same species, and have not yet been subjected to blight or other infection in the field. There are 20 or 25 excellent plants of *A. canadensis* near the water glass. The susceptibility of this species has been quite definitely established, and it can be used for comparison with the other species. The plants do carry out artificial inoculation experiments on some species, to determine as far as possible the susceptibility of each. Should there be sufficient growth during the spring of 1921, this work will be begun at that time by the Office of Forest Pathology under Mr. Macdonald's direction.

SECRETED BY THE NATIONAL ARCHIVES

During the 1950 season a number of seed collections were made of various species of currants and gooseberries. Lots of 100 seeds were turned over to U. S. Miller at Moscow for germination experiments. The seeds were placed in the hands of the Department of Horticulture, Oregon State College.

[illegible][illegible]

RECEIVED MAY 20 1968

Because the collections made for the Birds section at Washington
State of several species were collected and found very in the collection

Department at the college for planting on the East Farm. There were:
R. cereum, R. aureum, R. roosei (collected in California by Frank Felt),
R. cognatum, R. nivum and R. gooddingii.

FUNGI COLLECTED ON RIBES

While scouting for blister rust the following fungi have been collected on Ribes. Most of them are purely saprophytic, but some (such as the leaf spots and rusts) are parasitic. The list is tentative as too little work has been done to enable us to give the correct species in all cases.

Leaf diseases:

- Hormiactis ? sp. on R. bracteosum.
- Septoria aurea var. on R. aureum.
- Septoria ribis on R. viscosissimum and R. cruentum.
- Gleosporium ribis on R. lacustre, R. bracteosum, R. petiolare and R. Klamathense.
- Gleosporium ? sp. on R. bracteosum.
- Puccinia grossulariae on R. glutinosum.
- Puccinia parzeriae on R. lacustre and R. petiolare.

Cane Fungi:

- Neoklissalaria ribis ? on R. petiolare and R. bracteosum.
- Pleonectria Harolensis Sacc. on R. cognatum and R. Klamathense (rare). It should be carefully searched for.
- Diplodia ? sp. on R. Klamathense.
- Rhynchospora raduloides on R. bracteosum.
- Diplodia grossulariae on R. triste.
- Calospora ? sp. on R. bracteosum.
- Flourentia ribis on R. irriguum, cultivated gooseberry and on R. vulgare.
- Ophiobolus sp. on R. sanguineum.
- Gibberidea sp. on R. petiolare.
- Gibberidea sp. on R. cognatum.
- Cenogium sp. on R. cognatum and R. watsonianum.
- Zignoella sp. on R. cognatum.
- Rossilinia sp. on R. petiolare.
- Rossilinia sp. on R. triste.
- Neostomyces ? sp. on R. petiolare.
- Hidymophaeria ? sp. on R. bracteosum.
- Ascosporia sp. on R. watsonianum.
- Nectria sp. on R. bracteosum.
- Heloglyphus sp. on R. sanguineum.
- Dendrophoma sp. on R. watsonianum.
- Coniothyrium sp. on R. bracteosum.
- Phiala ? sp. on R. marshallii.

... ..
... ..
... ..

1941-1942

The following is a list of the specimens collected on this trip, arranged in the order in which they were collected. The specimens are arranged in the order in which they were collected, and the list is arranged in the order in which they were collected.

Microsporum ? sp. on R. practosum.
Puccinia gibberula on R. practosum.
Puccinia gibberula on R. practosum.
Puccinia gibberula on R. practosum.

1. *Chrysomelidae* (see p. 100)
2. *Chrysomelidae* (see p. 100)
3. *Chrysomelidae* (see p. 100)
4. *Chrysomelidae* (see p. 100)
5. *Chrysomelidae* (see p. 100)
6. *Chrysomelidae* (see p. 100)
7. *Chrysomelidae* (see p. 100)
8. *Chrysomelidae* (see p. 100)
9. *Chrysomelidae* (see p. 100)
10. *Chrysomelidae* (see p. 100)

[illegible]

Cane Fungi (Continued)

- Stictus ? sp. on R. sanguineum.
- Scleroderris ? sp. on R. bracteosum.
- Godronia sp. on R. bracteosum.
- Godronia sp. on R. menziesii.
- Godronia sp. on R. lacustre.
- Godronia sp. on R. howellii (R. acerifolium).
- Godronia sp. on R. cognatum.
- Godronia sp. on R. sanguineum.
- Godronia sp. on R. triste.
- Godronia sp. on R. watsonianum.

FIELD SCOUTING

As time permitted, special trips were taken to make a study of Ribes species of southern Oregon and adjacent parts of California and Nevada. Collections were made of R. velutinum and R. cereum. These two species have some very pronounced variations that suggest varietal characters if not distinct species. They are to be given critical study later.

During the trip from Klamath Falls to Lakeview, some scouting was done for blister rust. R. aureum, an excellent host for the disease, was found growing abundantly along the shores of Sprague River and its small tributaries. This stream rises in the Fremont National Forest. It should be carefully scouted in 1931.

EDUCATIONAL ACTIVITIES

On September 22, a blister rust exhibit was set up at the Oregon State Fair at Salem, Oregon, space having been allotted for this purpose in the Forestry building by the State Board of Forestry. The exhibit occupied a conspicuous place, and was well illuminated by a flood light. It consisted of a mounted series of pictures from one of the envelopes of student materials, a five-wing exhibit set, a large pickled specimen of the aecial stage of blister rust, two six-tube exhibit boxes, a number of Riker mounts of the telial and uredinial stages, and cones of western white, white-bark and sugar pines. A large placard reading "A Matter of Life and Death to White Pines", printed in yellow upon a green background was placed above the display and aided in attracting attention. A number of copies of Miscellaneous Publication No. 23 and the Oregon "Questions and Answers on Blister Rust" for 1930 were placed with the exhibit, and many were taken away by people who were interested.

The exhibit was left until September 28, the final date of the fair.

In February 1930 an exhibit very similar to the above was placed with the Botany Department's display at the annual Educational Exposition at Oregon State College.

L. N. Goodding attended the meetings of the A.A.A.S. at Eugene, Oregon June 18-21. A blister rust exhibit was displayed in the hall where registration took place and where much of the routine business of the society was conducted. It elicited much favorable comment, and literature was distributed. A leading article in the Portland "Morning Oregonian", following the meeting, was based on the mimeographed "Questions and Answers" distributed with Miscellaneous Publication 23 and the key to the Ribes of Oregon.

The usual educational work--illustrated talks and distribution of literature--was done in the botany classes at Oregon State College and in the Corvallis High School.

BLISTER RUST DEMONSTRATION PLOT

In the spring, Goodding assisted by Professor H. P. Barnes located an area of diseased pines and Ribes near Rhododendron to be used as a demonstration plot. Painted signs were placed on the trees and in clumps of Ribes, stating certain pertinent facts. Signs were also placed on the Mount Hood Loop Highway at the point where the side road leads to the plot. Literature in the form of questions and answers and Miscellaneous Publication 23 was left at Williamson's and at Zig Zag Ranger Station. Mr. Williamson not only handed many of these to visitors, but also mailed others to those having leases on recreational sites. Some of the lessees undertook the eradication of the Ribes on their land, a procedure not advocated by our office.

FORM LETTERS

Two annual letters to Forest Service men (A) and to fire wardens, field inspectors and county agents and fruit inspectors (B) are presented in transcript:

Dear Sir:

Under separate cover I am sending you a small exhibit box of white pine blister rust. I hope you will be able to find a conspicuous place for it in your office.

In a short time you will receive a letter giving the general conspectus of the present blister rust situation in Oregon. You will find enclosed with it certain literature on the disease which I hope will prove of interest to you.

Your cooperation is sincerely appreciated.

Yours very truly,

1945 and 1946, the number of cases of diphtheria in the United States was 1,000.

In February 1961, the British Council in London, in cooperation with the British Council, organized the annual Educational Conference in London, which was held at the Royal Albert Hall.

[illegible]

BY THE COURT: WILLIAM J. HAYES
JUDGE OF THE DISTRICT COURT OF THE DISTRICT OF COLUMBIA

Hides on their land, a procedure not unknown to our people. Some of the houses and other buildings of the
 several sites. Some of the houses and other buildings of the
 to visitors, but also rather strong evidence of the
 all the people there. Mr. Williams and wife handed many of these
 and Williams' collection to the U.S. National Museum and Mr.
 from birds to the birds. Williams is the son of a farmer and hunter
 lived on the land and lived as the birds were the birds
 in charge of birds, small mammals and birds. There were also
 as a mammalogist and, I think, also as a bird collector.
 located on one of several sites and birds were abundant in the land.
 In the spring, Williams collected in the spring of 1912.

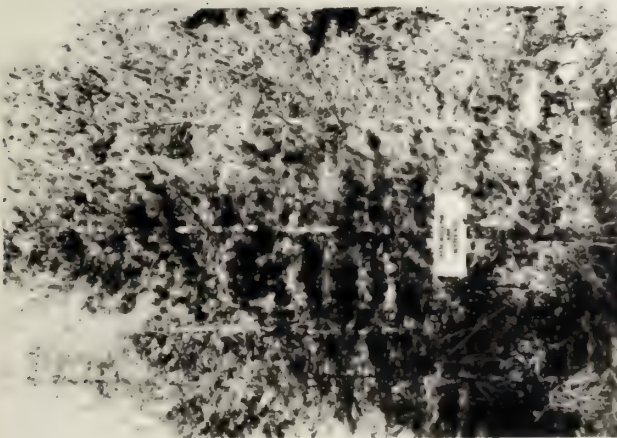
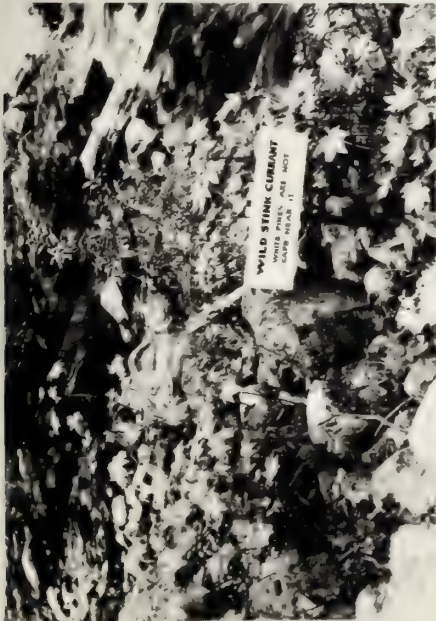
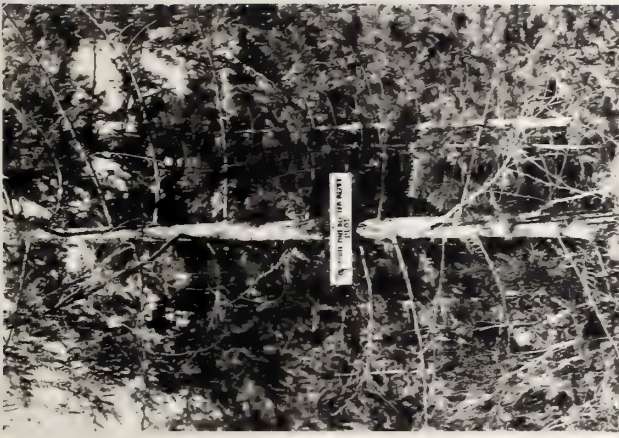
2025 JUL 15 1964

Dear Sir: I have your letter of the 14th inst. and in reply to inform you that the same has been forwarded to the proper authorities for their consideration. I am, Sir, very respectfully,
Yours, very truly,
J. H. [Signature]

is a short time you will receive a letter from the
correspondence of the present district that is under
the way. I am sure it will be a very
one. I am sure it will be a very
one. I am sure it will be a very

Two cooperation is already mentioned.

YOUNG & CO. NEW YORK



RHODODENDRON DEMONSTRATION PLOT



...not suggested (B) the following...
Dear Sir:

I am sending you the season's reminder that white pine blister rust is still with us, in fact it is rapidly reaching serious proportions. If you are not acquainted with the disease read about it in the enclosed publications. You may be interested in doing so anyway.

Here are a few of the Oregon highlights on the disease:

1. It was discovered on currants in Oregon in 1920, three or possibly five years after it had entered the state.

2. Last season it was found on currants near the California line in Curry County and on the Metolius River in Jefferson County.

3. In 1929 "flags" (dead branches) caused on pines by the disease were evident in many places.

4. In 1930 some entire trees are dead and others are rapidly dying.

5. It has not been found on pines outside the Mt. Hood region, but indications point to infection.

6. Currant infection (which always precedes pine infection) is within the range of sugar pines in the coast range and in the Metolius region in the Cascades.

7. Control work is being carried on in the Still Creek region in Mt. Hood National Forest.

Please send us specimens of diseased pines or currants and gooseberries you suspect of having blister rust, and ask any questions you wish to about the disease.

Thanking you for your cooperation, I am

Sincerely,

Yours very truly,

RIBES SUPPRESSION EXPERIMENTS

In contemplation of some experimental work in suppression of Ribes by means of grasses, the Corvallis office cooperated with Mr. Johnson at Missoula. After consulting with Professor Schoth, a tentative list of grasses was obtained. Letters were then written to different agronomists in the West asking their advice. As a result of correspondence with these men, after consulting several seed catalogues, certain grasses were chosen. I believe Mr. Johnson used some grasses or case the seed cannot be obtained on the spot locally, which can be grown and it be generated in the field.

(8)

4718 1607

I am sending you the section's register that will give details of all the work done. It is very interesting and shows the progress of the work. If you are not acquainted with the names mentioned in it, please let me know. You may be interested in doing so.

1. It was discovered on Thursday in 1951, about 10 years after it had entered the State.

2. Last season it was found on streams near the California-Idaho border in Carvy County and on the Snake River in Jefferson County.

2. In 1947 "T-1" (dead branches) covered on ground by the branches were evident in many places.

4. In 1930 some engine tests were done and electric and magnetic fields

5. It has not been found on ground outside the M. food regions, but indications point to infection.

A. Bureau advised (which was previously stated) that the Bureau has no information as to whether or not the Bureau has received any information from the Bureau regarding the Bureau's activities.

7. Control work is being carried on in the Bull Creek region in
Mt. Hood National Forest.

You wish to about the disease.
I understand you suggest it having killed you, but was any treatment
Please send an account of the case along in various ways.

Thanking you for your cooperation, I am

1900

STANDARD 33 COLLECTED FROM INSIDE

in consideration of some circumstances with in connection to
 signs of means of transfer. The Detective Office suggested that
 Johnson at this time. After consulting with the District Attorney, a
 five list of names was obtained. Letters were then written to
 different attorneys in the West asking their advice. As a result of
 correspondence with these men, after consulting several more attorneys,
 certain names were chosen. I believe Mr. Johnson had some influence in

grass mixtures not suggested in the following list. Results of this planting will be found in Johnson's 1930 report for Montana. The attached correspondence is pertinent to the subject.

Grasses Adapted to Various Northwest Forest Areas for
Probable Control of Ribes Species.

(List prepared by H. A. Schöth, Oregon State)

A. Swampy areas

Reed canary grass - Phalaris arundinacea
Creeping bent - - Agrostis maritima
Mountain sedge - Carex sp. (Rip gut grass)
Reed fescue - - Festuca arundinacea
Canada reed bent - Calamagrostis canadensis

B. Areas with abundant moisture but not swampy

Red top - - - - Agrostis alba
Meadow foxtail - - Alleganum pratensis
Velvet grass - - Molca lanatus
Reed fescue - - - Festuca arundinacea
Tall fescue - - - Festuca elatior

C. Medium dry areas but still having enough moisture to grow grasses well

Mountain brome - - Bromus polyanthus
Smooth brome Bromus inermis
Tall fescue - - - Festuca elatior
Orchard grass - - Dactylis glomerata
Tall meadow oat grass - Arrhenatherum elatius
Sweet vernal grass - Anthoxanthum odoratum

D. Dry areas but still not too dry to grow certain grasses

Chewing fescue - - Festuca rubra fallax
Sheeps fescue - - - Festuca ovina
Red fescue - - - Festuca rubra
Hard fescue - - - Festuca duriuscula

The following are transcripts of letters relative to these experiments:

(a)

Dear Sir:

2-17-30

We are contemplating carrying on some experiments in brush suppression in forested areas. Can you recommend a grass, grasses or other forage plants for use along streams in the mountains where the brush has been removed and where rather heavy grazing is likely to occur? If so, please let me know where seed can best be obtained. In case the seed cannot be obtained on the open market, where and at what season can it be gathered in the field?

correspondence is pertinent to the subject.

1947-1948

[illegible]

1. General Information - General Information
 2. Administrative - Administrative
 3. Financial - Financial
 4. Legal - Legal
 5. Medical - Medical
 6. Other - Other

1. The first step is to identify the problem or goal. This involves understanding the current situation and what needs to be achieved.

[illegible]

CONFIDENTIAL

Wingless sirens - more distant
sirens wings - winged

10/1/1918 - 10/1/1918

Tell me how you feel - I'll tell you how I feel

U. Dry areas but still not too dry to grow certain crops

[illegible]

Red fucose
Red fucose
Red fucose

The following are the results of the survey:

Experiment 1

134

season can it be gathered in the field

Thanking you for any information you can give us, I am
Yours very truly,

Letter (a) was sent to the following:

C. R. Fleming, Nevada Agricultural College, Reno, Nevada.
A. W. Sampson, U. of Cal., Berkeley, California.
Alvin Kezer, Colorado Agricultural College, Ft. Collins.
Dr. Aven Nelson, U. of Wyoming, Laramie, Wyoming.
J. O. Stewart, Forest Service, Ogden, Utah.
D. B. Swingle, Montana State College, Bozeman, Montana.
F. V. Gail, U. of Idaho, Moscow, Idaho.
C. P. Wilson, New Mexico State College, New Mexico.
Dr. Harold St. John, Washington State College, Pullman, Washington.

(b)

Dear Johnson

2-10-30

I was talking with Wyckoff a couple of days ago and told him about our plan to sow grass seed in some of your burned-over land in the nursery at Hangan. He thought favorably of the undertaking. I have received letters from several different agronomists regarding grasses best suited for such purposes. The consensus of opinion seems to be that reedtop, blue grass, timothy, the slender wheat grass, and one of the brome grasses are the best for our use. Our station here suggests the reed canary grass for swamp areas. I hope we can try three or four different plots in the nursery. Perhaps we can judge from the results we obtain what our best bet will be in similar situations. I should like very much to try the reed canary grass in one plot, a mixture of timothy and reedtop in another, blue grass in another, and brome and slender wheat in another, providing, of course, we can obtain seed of all of these. With this brief outline of conditions for a or

How much of an area would you like to sow? Will you purchase the seed or shall I do so? How early should the area be planted? I should think the earlier the better.

Yours very truly,

PRE-ERADICATION, CRATER LAKE

On August 5-7 Strong, Benedict, Riley, Sipe and I made some observations on conditions in Crater National Park and conferred with Solinsky, Godfrey, Coffman and Vint. Owing to certain difficulties of eradication and uncertainty of opinion regarding its advisability in

to the fact that blister rust is not known to be in
and to the fact that the job of eradication is not

RECEIVED

Yours very truly,

(S) 1968-01-01

... ..

U.S. DEPARTMENT OF COMMERCE

Allya Bekov, Volynskaya, 19107, Leningrad, U.S.S.R.

... ..

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of these

I should think the earlier the better.

1. *What is the purpose of this study?*

1900

On August 27, 1964, the following information was received from the Bureau of the Federal Bureau of Investigation (FBI) regarding the activities of the Communist Party, USA, in the State of New York:

The following information was received from the Bureau of the Federal Bureau of Investigation (FBI) regarding the activities of the Communist Party, USA, in the State of New York:

The following information was received from the Bureau of the Federal Bureau of Investigation (FBI) regarding the activities of the Communist Party, USA, in the State of New York:

certain sections, we unanimously decided to postpone any eradication program for the next year and probably for the following one also. For the same reason we did not make estimates on probable costs of eradication. We wish to call your attention to certain conditions existing in the park, years and during that time the great damage to the susceptibility of the Ribes of the park.

Around the rim there are areas with stands of white-bark pine and mountain hemlock varying from pure stands of the former to pure stands of the latter. In many of these stands R. erythrocarpum forms a dense carpet. Around the rim, the chief problem of eradication would be with this species. R. hallii is rather abundant in places and R. cerean and R. lacustre are less frequent. These, however, present nothing new or difficult in eradication. R. erythrocarpum acts as a binder for the shifting lava ash, and without argument is one of the outstanding plants of the park in beauty. In the spring it is covered with abundant flowers, and in the fall it is a glowing mass of red fruits. At the edges of the patches, the trailing stems pull readily, but where they break from the roots which are numerous along the stems, they leave pieces of detached stem which can be expected to act as bits of crown. Back from the edges toward the center of the patches, hand pulling becomes increasingly difficult. Hand tools or some type of diggers would be necessary. As an alternative we could resort to chemical eradication. This would necessitate experimental work in advance.

There are extensive areas southeast and west of the rim at a lower altitude where there are varying amounts of western white pine. In some places protection seems warranted. The chief species of Ribes are R. cerean, R. erythrocarpum, R. binominatum and R. hallii. These are for the most part confined to the rims and the steep slopes of canyons. In no place is there a true stream type Ribes. R. binominatum is abundant, and owing to its trailing habits and the loose soil in which it grows would probably be the most difficult to eradicate.

With this brief outline of conditions for a background, allow me to give you an idea of the attitude of the park service. They are, so to speak, "between the devil and the deep blue sea". The principal region needing protection from the standpoint of the scenery is the rim. The landscape men object seriously to disturbing the natural appearance by the eradication of one species or the introduction of another. The artistic and aesthetic value of R. erythrocarpum can not be denied. They desire to save it for its beauty and for its value as a soil binder. They also wish to save the white-bark pine which in places is the only tree and which certainly is both artistic and aesthetic. They wish the pines protected, but do not wish the Ribes destroyed. Admitting that this is necessary, they object to chemical eradication because it makes the landscape unsightly and kills other plants as well as the Ribes. They object to eradication by hand and by hand tools because it destroys the beauty and removes the plants which bind the soil. Owing to this attitude, to the fact that blister rust is not known to be near the park at present, and to the fact that the job of eradication is not sufficiently large that

it could not be done promptly when the emergency arises, I made this proposition to the park officials, a part of which by the very nature of things is subject to approval; viz., that we postpone eradication for probably two years and during that time get all information possible on the susceptibility of the Ribes of this region, particularly of R. erythrocarpum and ascertain by scouting the advance of the disease toward the park each season. I thought the best method to use in ascertaining the susceptibility was one suggested by Mr. Sipe last year, i.e., introduction of plants of the species we wish to study into the Rhododendron region. I have talked this matter over with Lachmued, and he has agreed to take the necessary data each season if we can establish the plot. My idea is to make the experiment of sufficient proportions to give adequate information and to make it apply to all the important species of the general region, namely: R. erythrocarpum, R. binominatum, R. hallii, R. cruentum and R. klamathense, R. cereum and R. lacustre have been studied sufficiently in other sections to make it unnecessary to include them.

(This report was prepared by L. N. Goodding in collaboration with C. C. Strong.)

EAGLE CREEK PLOT SITE SURVEY

By
E. L. Joy, Jr. Forester

White pine blister rust was first found on pines in the Eagle Creek drainage in 1928 by Lyle. This area of infection is 7 to 8 miles from the Columbia River Highway in township 1 north, range 8 east, sections 8, 17, 19 and 20 on the Bull Run Division of the Mt. Hood National Forest, Hood River County, Oregon.

Below the 7-mile point the stream flows through a deep rocky canyon in a series of waterfalls and rapids. Because the exposed rock formation is very dry and the canyon deep and narrow, there are very few white pines and Ribes near the stream. Above the 7-mile point the area, which is an old burn, is more open and supports a scattered stand of coniferous reproduction 11 to 20 years old, a large per cent of which is western white pine. Most of these pines grow in the moist stream bottoms.

On this area also grows an abundance of R. bracteosum and R. lacustre in patches along the streams and R. sanguineum on the benches and slopes. It is in this locality above the 7-mile point that the disease, probably of 1923 origin, is well established and widespread.

In the fall of 1929 Putnam and Goodding scouted here and made a study of the infection. The possibility of establishing a plot to study the effect of R. sanguineum was suggested when it was found that infected pines and R. sanguineum were on the area. Goodding, Joy, Myers and

Chapman made a survey in this region May 10-13, 1930 to determine the feasibility of establishing this plot. The following points were considered while making this survey:

1. Abundance of blister rust on white pines.
2. Nature of the association of white pines and R. sanguineum.
3. Quantity of Ribes other than R. sanguineum, that would have to be eradicated from the plot site and the area around the plot.
4. Nature of the topography of the region.
5. Accessibility of the area.

Infected white pines were found in all parts of this area, the heaviest infection near the streams but a considerable amount on the slopes. In order to determine the general infection conditions, data were taken on the trees of sample plots on the east side of Eagle Creek in the stream type (maximum of 200 feet from the stream), on the bench land (200-500 feet) and on the slope (500 to 2,000 feet). Following is a summary of these data:

TABLE NO. 1
DISTRIBUTION OF INFECTION AS FOUND NEAR THE STREAM ON THE BENCH LAND AND ON THE SLOPE

| Plot Situation | No. Trees Exam. | No. Trees Infected | % Trees Infected | Total No. Cankers | No. Cankers Per Tree Exam. |
|----------------|-----------------|--------------------|------------------|-------------------|----------------------------|
| Stream | 37 | 28 | 75.7 | 190 | 5.14 |
| Bench | 47 | 22 | 46.8 | 44 | 0.94 |
| Slope | 28 | 9 | 32.1 | 15 | 0.54 |
| Total | 112 | 59 | 52.7 | 249 | 2.22 |

It is evident that, although infection is heaviest on trees near the streams there is a considerable amount on the trees of the slopes. Where patches of Ribes sanguineum were found the adjacent pines were heavily infected even on the upper slopes approximately one mile from Eagle Creek.

The cankers on the infected trees of the three sample plots were examined to determine the year of growth infected and the stage of development of each. A summary of these results is found in the following table:

Lawson made a survey in this region in 1910. The following notes were taken during the survey:

1. Incidence of blisters was on white pine.
2. Nature of the association of white pine and blisters.
3. Quantity of blisters found in different parts of the tree.
4. Nature of the topography of the region.
5. Nature of the climate.

In order to determine the general incidence of blisters, a survey was made in all parts of this region. In order to determine the general incidence of blisters, a survey was made in all parts of this region. In order to determine the general incidence of blisters, a survey was made in all parts of this region.

TABLE NO. 1

DISTRIBUTION OF INFECTION IN WHITE PINE TREES IN THE REGION

| Location | White Pine | Blister | Incidence | Total |
|----------|------------|---------|-----------|-------|
| Forest | 10 | 10 | 20 | 20 |
| Mountain | 10 | 10 | 20 | 20 |
| Valley | 10 | 10 | 20 | 20 |
| Total | 30 | 30 | 60 | 60 |

It is evident that, although blisters are found in all parts of the region, the incidence is not uniform. The incidence of blisters is not uniform in all parts of the region.

The survey on the incidence of blisters in white pine trees in the region was made in all parts of the region. The survey on the incidence of blisters in white pine trees in the region was made in all parts of the region.

The survey on the incidence of blisters in white pine trees in the region was made in all parts of the region. The survey on the incidence of blisters in white pine trees in the region was made in all parts of the region.

TABLE NO. 2

abundant on part of the tributaries.

SUMMARY OF ALL CANKERS EXAMINED ON THREE SAMPLE PLOTS FOUND
ON THE EAGLE CREEK INFECTION AREA

| Year | First
Symptoms | Juvenile | Pycnial
Scars | Produced Aecia | | | |
|-------|-------------------|----------|------------------|----------------|-------|------------|-------|
| | | | | Once | Twice | Dev. Times | Total |
| 1927 | 1 | 12 | 12 | 9 | 0 | 0 | 24 |
| 1926 | 1 | 29 | 41 | 31 | 2 | 2 | 102 |
| 1925 | 2 | 18 | 28 | 39 | 0 | 2 | 89 |
| 1924 | 0 | 2 | 4 | 10 | 0 | 1 | 17 |
| 1923 | 0 | 1 | 0 | 3 | 0 | 2 | 6 |
| 1922 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1921 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1920 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1919 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Total | 4 | 62 | 85 | 92 | 0 | 6 | 249 |

Of the 249 cankers found on the 59 infected trees only one, that on growth made in 1919, is a positive clue to the probable year of origin of this infection center, presumably 1920. Two of the 8 cankers on 1920 growth could have originated in 1923 but if this is true there should be a few cankers on the growths made in 1922, 1921 and 1920 as well as 1923 and 1919. Also, if the original infection occurred in 1919, 1920, 1921 or 1922 the fruiting of this canker, which would normally be three years later, should have caused some cankers on the growths from 1920 to 1922 as well as a noticeable increase in the number of cankers on wood which was one year old during the first year of fruiting. By 1930 these cankers would have fruited two times or more. Such is not the case, according to the above summary.

Because of the above reasoning and the fact that 1923 was the year of origin of many pine infection centers due to favorable conditions we conclude that the most probable year of origin of this infection center was 1923. It is also believed that a thorough scouting of all the pines in this vicinity would reveal several more cankers on old growth that originated during the same year as the one found on 1919 growth.

Although *R. sanguineum* is quite generally distributed over this region, the larger patches or concentrations are on the upper slopes where the pines are very scattered. In general the association is not satisfactory for a study plot in this region.

A survey was made of the *Ribes* along Eagle Creek and its tributaries for a distance of one mile each way from the shelter house, which is approximately the location of the proposed plot. In this distance of two miles there are 23 tributaries to Eagle Creek, 15 year-round streams and 8 seeps. *R. bracteosum* is in scattered patches along Eagle Creek and part of the tributaries but in general is abundant. *R. lacustre* is also

WILLIAM HENRY WARD HAS A LONG RECORD OF CONTINUOUS SERVICE IN THE U.S. ARMY

1964-1965

[illegible]

Of the 441 caskets found on the 25 selected graves only one on proven made in 1917, is a positive clue to the historical value of this infection complex, obviously 1917. Two of the 2 caskets on 1244 graves could have originated in 1917 and if this is true there should be a few caskets on the graves made in 1917, 1918 and 1919 as well as 1920 and 1921. Also, if the original infection occurred in 1917, 1918, 1919 or 1920 the timing of this contact, which would normally be three years later, should have a much more emphasis on the graves from 1920 to 1922 as well as a noticeable increase in the of caskets on wood which was one year old during the first year of planting. By 1920 these caskets would have finished two times or more. Such is not the case, according to the above summary.

part of the literature but in general is abundant. A. ...
A. ... is in western ...
... are ...
... the location of the ...
... a distance of ...
A survey was made of the ...
... to ...
... for a study plot in this region.

abundant on part of the tributaries.

The slopes on both sides of Eagle Creek are very steep, in some places precipitous. There are many waterfalls, both on the main stream and its tributaries, several of these 20 to 100 feet high. Although there is a good trail from the Columbia Highway to this region, the area in the vicinity of the proposed plot site is not readily accessible.

Summarizing this survey, it was deemed inadvisable to establish a plot on Eagle Creek because of (1) the extremely large, difficult and expensive task of eradicating the undesirable Ribes; (2) the lack of sufficient pines and *A. sanguineum* in association for a satisfactory plot, (3) the inaccessibility of the area.

Effective July 1, 1930

4. The BOARD OF PLANT INDUSTRY agrees to:

- (1) pay the salaries and necessary travel expenses of one or more persons to carry out the work;
- (2) assist in systematically locating and destroying colonies of the pest; and
- (3) conduct experiments in control reconnaissance and local eradication, demonstrate the practical application of control practices, and furnish data on the spread of the pest; and
- (4) coordinate control activities of the several cooperating agencies by furnishing regional leadership and supervising the employees and the cooperating operators with broader regional control and technical information.

5. The U. S. DEPARTMENT OF AGRICULTURE agrees to:

- (1) provide the necessary funds and personnel to carry out the work;
- (2) during the proper season, inspect plantations for the presence of the pest; and
- (3) by its regular employees, so far as their duties permit, assist in systematically locating and destroying colonies of the pest; and
- (4) furnish the necessary technical information and other data for the purpose of the work.

40% of the total and to keep on increasing

The slayer or both a lot of people look are very steep. In some places precipitation. There are many waterfalls, both on the main stream and the tributaries, several of them 50 to 100 feet high. There is a good trail from the village to the top of the mountain in the vicinity of the mountain side is not nearly so steep.

1. The first of these is the fact that the Commission has not yet received any information from the Government of the United States regarding the activities of the Committee for the Liberation of the Americas (CLA) in the United States. The Commission is therefore unable to determine whether the CLA is active in the United States or whether it is merely a front organization for the CIA.

BLISTER RUST CONTROL WORK IN CALIFORNIA

and such enforcement of state law 1930 may be necessary for the prosecution of blister-rust-control work; and

Blister rust control activities in California were continued as a cooperative project between the Bureau of Plant Industry and the California Department of Agriculture, California State Board of Forestry, College of Agriculture, University of California and the Department of Botany, University of California. There is given below the amendment to the basic memorandum of understanding, which was drawn up to cover the cooperative work for the fiscal year 1931 beginning July 1, 1930:

scouting for white-pine blister rust and assisting in the

MEMORANDUM OF UNDERSTANDING

stands as a basis for control of Between

THE BUREAU OF PLANT INDUSTRY, U. S. DEPARTMENT OF AGRICULTURE
and

THE CALIFORNIA DEPARTMENT OF AGRICULTURE - - - THE CALIFORNIA STATE
BOARD OF FORESTRY - - and the COLLEGE OF AGRICULTURE
and DEPARTMENT OF BOTANY, UNIVERSITY OF CALIFORNIA

Relative to

Cooperative White Pine Blister-Rust-Control Work in California.

Effective July 1, 1930

ability of direct eradication of Ribes.

* * *

A. The BUREAU OF PLANT INDUSTRY agrees to:

- (1) Pay the salaries and necessary travel expenses of one or more employees who shall conduct such work; or for
- (2) Assist in systematically locating and destroying cultivated black currants (Ribes nigrum) under state authority;
- (3) Conduct experiments in control reconnaissance and local Ribes eradication, demonstrate the practical application of control practices, and obtain data on the spread of the rust; and
- (4) Coordinate control activities of the several cooperating states and agencies by furnishing regional leadership and supervision, and to provide employees and the cooperating agencies with blister rust subject matter and technical information.

B. The CALIFORNIA DEPARTMENT OF AGRICULTURE agrees to:

- (1) Pay the salaries and expenses and direct the work of one or more men who shall, during the proper season, inspect plant shipments for violations of blister-rust quarantines;
- (2) Use its regular employees, so far as their other duties permit, and direct their work in systematically locating and destroying cultivated black currants, scouting for white pine blister rust and inspecting nurseries for this disease;

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5. 274

1907, July 16, p. 11, 899.

(1) To pay the salaries and necessary travel expenses of one or more employees who shall conduct said work;

(2) To test in experimental fashion the proposed method of collecting black earths (black sludge) from these sources;

(3) To conduct research in control techniques and control equipment, determine the practical application of control equipment and obtain data on the extent of the work;

(4) Coordinate control activities of the several participating states and agencies by furnishing technical assistance and by making and to provide employees and the participating agencies with the latest and best material and technical information.

(i) pay the salaries and expenses and direct the work of the more men who shall, during the proper season, be engaged in the for violation of a labor-law provision;

(d) use the regular employees, so far as their other duties and direct time in systematically locating and destroying the same insects, securing the same and other insects for this disease;

(3) Undertake such destruction of white pine or Ribes in California and such enforcement of state laws as may be necessary for the effective prosecution of blister-rust-control work; and

(4) Furnish the state leader in charge of blister-rust control work in California such office space as may be necessary for the proper conduct of his work. *submitted in manuscript form*

C. The CALIFORNIA STATE BOARD OF FORESTRY agrees to:

(1) Use its regular employees, so far as their other duties permit, in systematically locating and eradicating cultivated black currants, scouting for white-pine blister rust and assisting in the compilation of information concerning location, ownership and volume of sugar pine stands as a basis for control work.

D. The COLLEGE OF AGRICULTURE, UNIVERSITY OF CALIFORNIA, agrees to:

(1) Assist employees of the Bureau of Plant Industry, through the University Division of Forestry, by furnishing available technical advice and records; *and records.*

(2) Provide office and laboratory facilities, through the University Division of Forestry, for employees of the Bureau of Plant Industry who are stationed in California to conduct technical studies upon the feasibility of chemical eradication of Ribes.

E. The DEPARTMENT OF BOTANY, UNIVERSITY OF CALIFORNIA agrees to:

(1) Assist employees of the Bureau of Plant Industry engaged in technical investigation of the chemical eradication of Ribes, by furnishing technical advice, and laboratory space for three workers.

F. IT IS MUTUALLY AGREED that:

(1) This memorandum may be terminated at any time by any one of the parties by written notice, and may be amended by written mutual agreement;

(2) The cooperative plan of work in this memorandum will be followed as being the best method of control of white-pine blister rust in California;

(3) All official records and reports of work performed under this agreement shall be open to inspection by any or all parties to this agreement, that all findings of blister rust made by any party to this agreement shall be promptly reported to all other parties to this agreement, and that all specimens collected by any party to this agreement which are suspected of being infected with blister rust shall be submitted promptly to the Bureau of Plant Industry for final determination;

(3) Undertake such destruction of white pine or other in California and such enforcement of state laws as may be necessary for the effective prosecution of white-pine-control work; and

(4) Transfer the state leader in charge of white-pine control work in California such office space as may be necessary for the proper conduct of his work.

C. THE UNIVERSITY OF CALIFORNIA AGREES TO:

(1) Use the regular employees, as far as their duties permit, in systematically locating and recording evidence of white-pine infestation for white-pine control work and assisting in the collection of information concerning location, symptoms and volume of white-pine infestation.

D. THE COLLEGE OF AGRICULTURE, UNIVERSITY OF CALIFORNIA, AGREES TO:

(1) Assist employees of the Bureau of Plant Industry, University Division of Forestry, by furnishing available technical advice and records;

(2) Provide office and laboratory facilities, through the University Division of Forestry, for employees of the Bureau of Plant Industry who are stationed in California to conduct technical studies upon the feasibility of chemical eradication of white-pine.

E. THE DEPARTMENT OF STATE, UNIVERSITY OF CALIFORNIA, AGREES TO:

(1) Assist employees of the Bureau of Plant Industry engaged in technical eradication of the chemical eradication of white-pine, by furnishing technical advice, and laboratory space for same work.

F. IT IS FURTHER AGREED THAT:

(1) This agreement may be terminated at any time by any one of the parties by written notice, and may be amended by written mutual agreement.

(2) The cooperative plan of work under this agreement shall be followed as being the best method of control of white-pine infestation in California, and technical assistance shall be given.

(3) All official records and reports of work performed under this agreement shall be open to inspection by any one of the parties to this agreement, and all findings of infestation shall be reported to the parties to this agreement, and that all specimens collected by any party to this agreement shall be reported to the Bureau of Plant Industry for their selection and utilization.

Witness my hand and the seal of the State of California, this _____ day of _____, 19____.

(4) The results of the cooperative work may be published jointly, or upon mutual agreement by either cooperating party, due credit being given to the cooperating agencies. All manuscripts therefor shall be criticised by the cooperating parties before publication; and all form letters, bulletins and any other circulars to be mailed in penalty envelopes shall be submitted in manuscript form for approval by the Bureau of Plant Industry before being printed or distributed;

(5) Obligations by the Bureau of Plant Industry are contingent upon appropriations being made therefor by Congress; and no funds of the United States shall be expended in compensation for host plants destroyed in control work;

(6) For the Fiscal Year 1931, the Bureau of Plant Industry shall contribute in value approximately \$27,700 to the support of this cooperative work, the California Department of Agriculture approximately \$9,000, the California State Board of Forestry approximately \$3,000, the College of Agriculture, University of California approximately \$10,000, and the Department of Botany, University of California shall contribute in value approximately \$3,000; thereafter the amount to be contributed by each shall be determined and agreed upon by supplemental correspondence or amendments.

Reports from the contributors of Orange, California, 1930-1931.

Date:

Signature:

6/23/30 (s) G. H. Hecke
Director, California Department of Agriculture

6/5/30 (s) M. B. Pratt
State Forester, California State Board of Forestry

June 11, 1930 (s) O. M. Hutchinson
Dean, College of Agriculture, University of California

June 12, 1930 (s) S. A. Setchell
Department of Botany, University of California

July 9, 1930 (s) Wm. A. Taylor
Chief, Bureau of Plant Industry

The inspection of the orange groves of the State of California by the Bureau of Plant Industry, during the summer of 1930, was a most successful one. A large number of the groves were visited, and the results of the inspection were most satisfactory. The groves were found to be in good health, and the fruit was of good quality. The inspection was made possible by the cooperation of the growers, and the results were most satisfactory. The inspection was made possible by the cooperation of the growers, and the results were most satisfactory.

(4) The results of the cooperative work may be published jointly.

or upon mutual agreement by either cooperating party, the results shall be given to the cooperating agencies. All commercial interests shall be excluded by the cooperating parties before publication. In all farm letters, bulletins and any other material to be mailed in general circulation shall be submitted to the Bureau of Plant Industry for approval by the Bureau of Plant Industry before being printed or distributed.

(5) Publication by the Bureau of Plant Industry and cooperation with other organizations being made incident to Congress and no funds of the United States shall be expended in cooperation for such work destroyed in control work.

(6) For the fiscal year 1931, the Bureau of Plant Industry shall contribute in value approximately \$2,700 to the support of this cooperative work. The California Department of Agriculture approximately \$10,000, the California State Board of Forestry approximately \$2,000, the College of Agriculture, University of California approximately \$10,000, and the Department of Botany, University of California shall contribute in value approximately \$5,000; therefore the amount to be contributed by each shall be detailed and agreed upon by supplemental correspondence or amendments.

(7) Private notice and information shall be given to the following:

Date: January 1, 1931, for completion of signature
and attention in California to complete signature

Director, California Department of Agriculture

(a) W. A. Taylor

(1) State Forester, California State Board of Forestry

Date: June 1, 1930 (a) O. A. Anderson

Dean, College of Agriculture, University of California

California

Date: June 1, 1930 (a) W. A. Taylor

Director, California Department of Forestry, University of California

Date: July 1, 1930 (a) W. A. Taylor

Chief, Bureau of Plant Industry

Approved: That all findings of fact and conclusions of law be given to the Bureau of Plant Industry for publication in the official journal of the Bureau of Plant Industry, and that all other material be given to the Bureau of Plant Industry for publication in the official journal of the Bureau of Plant Industry.

BLISTER RUST ACTIVITIES IN CALIFORNIA, 1930

Reports have continuously been received from several states. Some of these have come from George A. Root, Associate Pathologist.

Reports on the work under way in California have been prepared by the several project leaders concerned. The subjects reported on by the leaders are as follows: Ribes ecology by F. A. Petty; Control Reconnaissance by D. R. Miller and Experimental Ribes eradication by W. V. Benedict. The account of the investigations of blight in California is incorporated in H. R. Offord's special report.

BLACK CURRENT ERADICATION

The decrease in funds allotted to this project, on which ordinarily one or more well organized crews have been employed, meant a change in the usual procedure of work. The program, this year, called for the more active cooperation of the county agricultural commissioners and their inspectors who as their time permitted were to locate and destroy black current bushes in their counties or districts as best they could. Reports from the commissioners of Orange, San Bernardino, Riverside, Imperial, San Diego and Los Angeles counties state that no bushes have been found. The writer spent some time in each county, scouting in what seemed to be likely sections, but no plantings were found. It might seem that the apparent absence of black currents was due to the method of work, yet the general area comprising these counties is one not conducive to the growth of currents. This is evidenced by the lack of bushes found in contiguous counties, covered by the usual mode of scouting.

The year brings to a close the black current eradication project. Constant follow-up work will be necessary. Occasional plantings are found from time to time. One planting of six bushes was located in San Mateo County, one of two bushes in Sacramento County and one of nine in Riverside County. A re-inspection of a planting of 14 bushes in Siskiyou County found in 1921, revealed one bush this year.

NURSERY INSPECTION AND QUARANTINE MATTERS

The inspection of nurseries was largely carried on through the Office of the Superintendent of Nursery Service of the State Department of Agriculture. A close watch is being kept of blister rust hosts. New nurseries are constantly being established and the status of these is carefully listed. Certain nurseries which had 5-needled pines in the past were visited by the writer this year, but in each instance the trees had been disposed of and the growing of the same discontinued. This corroborated the idea that during the past five or six years, the private nursery carrying general stock had abandoned 5-needled pines.

REPORT OF THE COMMISSIONER OF THE LAND OFFICE

1917

Report of the Commissioner of the Land Office

Report of the Commissioner of the Land Office

Report of the Commissioner of the Land Office for the year ending June 30, 1917. The report contains a detailed account of the work of the office during the year, and a statement of the condition of the public lands of the State. The report is divided into two parts, the first of which contains a general statement of the work of the office, and the second of which contains a detailed account of the work of the office during the year.

GENERAL STATEMENT OF THE WORK OF THE OFFICE

The work of the office during the year has been largely devoted to the preparation of maps and reports, and to the management of the public lands. The office has also been engaged in the sale of public lands, and in the management of the public forests. The work of the office has been carried on in accordance with the provisions of the laws of the State, and the orders of the Governor. The office has also been engaged in the management of the public lands, and in the management of the public forests. The work of the office has been carried on in accordance with the provisions of the laws of the State, and the orders of the Governor.

The work of the office during the year has been largely devoted to the preparation of maps and reports, and to the management of the public lands. The office has also been engaged in the sale of public lands, and in the management of the public forests. The work of the office has been carried on in accordance with the provisions of the laws of the State, and the orders of the Governor.

DETAILED STATEMENT OF THE WORK OF THE OFFICE

1917

The detailed statement of the work of the office during the year is divided into two parts, the first of which contains a general statement of the work of the office, and the second of which contains a detailed account of the work of the office during the year. The work of the office has been carried on in accordance with the provisions of the laws of the State, and the orders of the Governor.

The state quarantine stations, particularly on the northern border, have continuously intercepted contraband blister rust material. Some of this has come from infected areas of several states. No infected material has been found, however.

THE SANITATION OF SUGAR PINES

In order to meet the conditions of the quarantine regulations under which white pines may be shipped from an infected state, it will be necessary to provide adequate protection against blister rust to the several California nurseries growing 5-needled pines. Although this state is officially considered non-infected, the rust may be discovered here in the near future. Nursery sanitation measures will permit the shipping of 5-needled pines from the state when California is classed as an infected state. Even though no pines are to be shipped interstate it is felt that the pines grown in these nurseries for planting within the state should be protected. For these reasons a study of the situation was begun this year.

A. The Elmer Tree Breeding Station:

This institution is situated near Placerville in El Dorado County in the foothills of the Sierra Nevada Range. It has approximately 1500 5-needled pines in the nursery beds, together with others in the arboretum which is an important adjunct to the institution. It has shipped pines all over the country and is desirous of continuing this program. The writer, aided by Benedict and Miller, presented an estimate of cost for the removal of Ribes within the prescribed 1500 foot zone. It is possible that this work will be started in 1931, the first of its kind in California.

B. Nursery of the Union Lumber Company:

This firm located at Fort Bragg, Mendocino County, is in a redwood section and grows primarily redwood trees. However, the nursery comprises numerous species of trees and shrubs including one bed of sugar pine. These are being grown in an experimental way and are shipped to all parts of the country when occasion demands. The forester of the company is desirous of affording protection to these pines, but is not in a position to allocate special funds for eradication work. Should this take place at some future time, nursery labor will undoubtedly be employed under supervision of the forester, who is well acquainted with Ribes and our method of work. To eradicate within the prescribed zone will not be difficult. Perhaps a year or two years can elapse before protection will be necessary. This will depend of course upon the rapidity with which the rust may reach this section.

Devil's Canyon Nursery, situated at the same station and is located about 12 miles from the same place. Its existence is justified by an endeavor to grow certain species of trees to meet some of the demands of the lumber industry in the same region, mainly as an

C. Nursery of the U. S. Forest Service:

The Susanville Nursery, established a few years ago, is located in Susanville in Lassen County. It comprises about seven acres on the outskirts of the city and will furnish trees for reforestation purposes for the Modoc, Lassen and Plumas Forests. With the exception of one bed of sugar pine, the greater majority of the trees are Yellow and Jeffrey pines. With sugar pine being grown here as an experiment there is some doubt as to whether the propagation of this species will continue in the future.

The 1500 foot zone around this nursery takes in a considerable stretch of open country, with some *R. roezli*, together with a residential section with but few cultivated *Ribes* plantings. One of these plantings comprises nearly 100 currants and roseberries from which some revenue is derived from the sale of fruit. Should eradication be decided upon at some future date, this difficulty can probably be adjusted. There is no necessity for immediate action concerning the sanitation of this nursery.

D. Nursery of the Fruit Growers Supply Company:

This is located not far from the Federal Nursery, and comprises but a small plot of ground. Yellow and Jeffrey pines are being grown almost exclusively with one bed of sugar pine. The same attitude is taken regarding sugar pine, and it would not be surprising if this species would be abandoned in so far as the propagation is concerned. The eradication of the prescribed zone would involve no great difficulty. It largely embraces a residential section with an area cut by a river the bed of which would probably contain a considerable number of *Ribes*.

E. and F. Nurseries of the Pacific Lumber Company and the Clover Valley Lumber Company:

These are respectively located in Humboldt and Sierra counties, the former in the redwood region and the latter in the pine region.

The Pacific Lumber Company, like the Union Lumber Company, is primarily interested in redwoods, and the small group of sugar pine now in the nursery will be disposed of in the event of the presence of the rust in that section. The Clover Valley Lumber Company attempted to raise sugar pine, but poor results led them to discontinue this species.

G. and H. The Devil's Canyon Nursery and the Nursery of Los Angeles County:

The Devil's Canyon Nursery belongs to the California Forest Experiment Station and is located about 12 miles from San Bernardino. Its existence is justified by an attempt to grow certain species of conifers to reforest some of the denuded and brush-covered slopes of that southern region, mainly as an aid to watershed protection. Just a few

[Faint, illegible handwritten text]

[illegible]

The 1940s were a period of great change for the United States. The country was a world leader in science, technology, and industry. The war had ended, and the country was looking for new challenges. The 1950s were a period of growth and prosperity. The economy was strong, and the country was expanding its influence around the world. The 1960s were a period of social change and civil rights. The country was facing new challenges, and the people were demanding change. The 1970s were a period of economic difficulty and social unrest. The country was facing new challenges, and the people were demanding change. The 1980s were a period of economic growth and technological advancement. The country was facing new challenges, and the people were demanding change. The 1990s were a period of economic growth and technological advancement. The country was facing new challenges, and the people were demanding change. The 2000s were a period of economic growth and technological advancement. The country was facing new challenges, and the people were demanding change. The 2010s were a period of economic growth and technological advancement. The country was facing new challenges, and the people were demanding change. The 2020s were a period of economic growth and technological advancement. The country was facing new challenges, and the people were demanding change.

2. University of the South Florida

[illegible]

Valley revolt. The new Communist Party of the United States of America (CPUSA) was formed in 1944, and the CPUSA was the only communist party in the United States to have a significant presence in the United States. The CPUSA was the only communist party in the United States to have a significant presence in the United States.

...the ... of ...

[illegible]

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED

The Wall's Stationary Railway to the Lighthouse is a narrow gauge railway and is located about 1/2 mile from the lighthouse. The railway is operated by an engine house at the lighthouse and is used to transport coal and other supplies to the lighthouse. The railway is a very interesting sight and is well worth a visit.

sugar pines are being grown, but little or no hope is extended for this species as a primary one for this type of planting. Coulter pine seems to be one of the most promising.

The Los Angeles County Nursery is situated on the Mt. Wilson Toll Road east of Altadena, and provides stock for planting out on certain County areas, also as an aid to watershed protection. There is one bed of sugar pine grown only for experimental purposes. None are to be planted out. This nursery like the foregoing one, does not warrant blister rust protection considering the present status which 3-needled pines hold in that southern region.

It must be said that the propagation of sugar pine with subsequent planting as a reforestation measure hangs in the balance. No private forestry nurseries will grow sugar pine on a large scale in the light of present day results, and there is a question whether enough will be grown to warrant the cost and trouble involved in establishing protective zones except in a few cases.

SCOUTING FOR THE 21ST CENTURY

The presence of the rust on Ribes in southwestern Oregon in 1929, less than 50 miles from the California line, led one to believe it would be found in this state in 1930. With this thought in mind an intensive survey was made in Del Norte, Siskiyou and a part of Humboldt County during September by four men with two autos. The failure to find the rust at the two Oregon infection points of 1929, or even in the surrounding territory, lessened the possibility of finding it south of the Oregon line. No signs of the rust were found.

Most of the scouting was done along the Smith River and Klamath River drainages. The work in the coast region was confined to inspections of A. bracteosum in certain localities where the bushes were not screened but well in the open. This seemed the best course to pursue with the situation as it stood.

[illegible]

These pines are being found, but little or no hope is expected for this species as a variety and for this type of planting. Coulter pine seems to be one of the most promising.

The Los Angeles County nursery is situated on the Mt. Wilson toll road east of Los Angeles, and occupies about 100 acres of land. It is situated on a hillside, and the soil is very rich. The nursery is now in its fourth year, and the trees are growing very well. The nursery is now in its fourth year, and the trees are growing very well. The nursery is now in its fourth year, and the trees are growing very well.

It must be said that the propagation of these pines with all the present facilities is a tremendous task. It is a task that requires a great deal of time and money. It is a task that requires a great deal of time and money. It is a task that requires a great deal of time and money.

PLANTING THE PINE

The purpose of the test on pines in southwestern Canada is to determine the best time to plant them. The test is being conducted in the spring of 1934, and the results will be reported in the summer of 1935. The test is being conducted in the spring of 1934, and the results will be reported in the summer of 1935.

Most of the seedlings are now in the ground, and the results of the test are being reported. The test is being conducted in the spring of 1934, and the results will be reported in the summer of 1935. The test is being conducted in the spring of 1934, and the results will be reported in the summer of 1935.

The test is being conducted in the spring of 1934, and the results will be reported in the summer of 1935. The test is being conducted in the spring of 1934, and the results will be reported in the summer of 1935. The test is being conducted in the spring of 1934, and the results will be reported in the summer of 1935.

THE PINE NURSERY

The nursery is now in its fourth year, and the trees are growing very well. The nursery is now in its fourth year, and the trees are growing very well. The nursery is now in its fourth year, and the trees are growing very well.

TABLE NO. 1

INVESTIGATION OF THE REDWOOD CREEK, CALIFORNIA

| Location | Species Examined | No. Bushes | *Pine Ass'n. | Remarks | Inspectors | Date |
|--|------------------|------------|--------------|--|---------------------|---------|
| Several points along Redwood Creek, T. 9N., R. 2E., Sec. 5 and in T. 10N., R. 2E., Sec. 30 and 32. | R. bracteosum | 45 | Very poor | Ribes occur in patches on most any side stream | Benedict and Harris | 9/19/30 |
| Along road S. side of Klamath River, N. of Martin's Ferry, T. 10N., R. 4E., Sec. 18 and 19 | R. cruentum | 75 | " | Apparently no R. bracteosum | " | 9/20/30 |
| S. of Weitchpec on Pull Creek T. 9N., R. 4E., Sec. 14 | R. bracteosum | 5 | Poor | --- | " | " |
| S. of Weitchpec on Norton Creek, T. 9N., R. 4E., Sec. 20 | R. cruentum | 25 | " | Ribes along road | " | " |
| On Wlathern Creek, S. of Orleans T. 10N., R. 5E., Sec. 2. | R. klamathense | 10 | " | Sugar pine along ridges | " | " |
| Near Orleans up Camp Creek T. 11N., R. 5E., Sec. 22. | R. bracteosum | 10 | " | Ribes scattering | " | 9/21/30 |
| Near Jct. Camp Creek and Highway, T. 11N., R. 5E., Sec. 30. | R. cruentum | 50 | " | --- | " | " |
| Acerris ranch, near Orleans T. 11N., R. 5E., Sec. 31 | R. cruentum | 15 | " | --- | " | " |

* By "Pine Association" is meant the distance from Ribes to pines according to the following legend:

Excellent - Pines within 100 feet.

Very good - Pines 101 to 150 feet distant.

Good - Pines 151 to 500 feet distant.

Fair - Pines 501 to 1,000 feet distant.

Poor - Pines 1,001 to 1,500 feet distant.

Very poor - Pines over 1,500 feet distant.

TABLE NO. 2

INSPECTION POINTS IN DEL NORTE COUNTY, CALIFORNIA

| Location | Species Examined | No. Bushes | Pine Association* | Remarks | Inspector | Date |
|---|------------------|------------|-------------------|---|------------|---------|
| Along small creek, just in MacBeth Ranch, E. of Turwar Creek, T. 13 N., R. 2 E., Sec. 18. | R. bracteatum | 50 | Very poor | --- | Root Patty | 9/20/30 |
| On island in Turwar Creek - 200 yds. N. of bridge, T. 13 N., R. 2 E., Sec. 18. | R. divaricatum | 20 | Very poor | Exposed | Patty | 9/20/30 |
| About 1/4 mi. W. of highway on road to Requena - near white house, Down creek, T. 13 N., R. 1 E., Sec. 4. | R. bracteatum | 40 | Poor | Very good point | Patty | 9/20/30 |
| Wilson Creek - both sides of Redwood Highway - more east side, T. 14 N., R. 1 E., Sec. 18. | R. bracteatum | 100 | Poor | Very good point | Root | 9/20/30 |
| Creek at Ender's Beach - both sides of highway - more on east side, T. 15 N., R. 1 E., Sec. 2. | R. bracteatum | 75 | Very poor | --- | Patty | 9/20/30 |
| Gilbert Creek - both sides of highway. N. W. corner of county, T. 18 N., R. 1 E., Sec. 5. | R. sanguineum | 5 | Poor | --- | Patty | 9/20/30 |
| Along creek, tributary to Rowdy Creek about 1-1/2 mi. E. of town of Smith River. N. side of road. T. 18 N., R. 1 E., Sec. 24. | R. bracteatum | 100 | Very poor | Very good point | Gooding | 9/19/30 |
| About 2 mi. N. of Hionchi Bridge on road to Smith River. 1st wooden bridge - both sides stream. T. 17 N., R. 1 E., Sec. 29. | R. bracteatum | 30 | Very poor | Exposed | Patty | 9/25/30 |
| About 3/4 mi. W. Hionchi Bridge, Redwood Highway. Swamp. T. 16 N., R. 1 E., Sec. 5. | R. bracteatum | 40 | Very poor | --- | Root Patty | 9/25/30 |
| About 1-1/2 mi. E. of bridge crossing Rowdy Creek along old Grant's Pass road, side stream. T. 18 N., R. 1 E., Sec. 29. | R. bracteatum | 60 | Very poor | Exposed | Gooding | 9/20/30 |
| 2-1/2 mi. E. of Gasquet along Grant's Pass Highway. Both sides road. T. 17 N., R. 2 E., Sec. 22. | R. bracteatum | 5 | Very poor | --- | Root | 9/27/30 |
| Up Patrick Creek, back of Tavern on Grant's Pass Highway. T. 17 N., R. 3 E., Sec. 8. | R. sanguineum | 10 | Good | Considerable western white pine. Inspected 100 trees. | Patty | 9/28/30 |
| About 2 mi. above last concrete bridge going N. toward California-Oregon line, T. 18 N., R. 4 E., Sec. 21. | R. cruentum | 50 | Very good | Scattered white pine. | Root | 9/28/30 |
| About 1 mi. S. Oregon line. Not far from Sixtyon Restaurant and camp ground along creek, T. 18 N., R. 4 E., Sec. 2. | R. bracteatum | 30 | Good | R. bracteatum along river near highway. | Patty | 9/28/30 |
| | R. bracteatum | 10 | Good | R. bracteatum well exposed. | Root Patty | 9/28/30 |

*By "Pine Association" is meant the distance from Ribes to pines according to the following legend:

Excellent - Pines within 100 feet.

Fair - Pines 501 to 1,000 feet distant.

Very good - Pines 101 to 250 feet distant.

Poor - Pines 1,001 to 1,500 feet distant.

Good - Pines 251 to 500 feet distant.

Very poor - Pines over 1,500 feet distant.



TABLE NO. 3
INSPECTION POINTS IN SISKIYOU COUNTY, CALIFORNIA

| Location | Species Examined | No. Bushes | Pine Assoc-iation* | Remarks | Inspectors | Date |
|---|-------------------------|------------|--------------------|---|-----------------|---------|
| Butler Creek - tributary of Salmon River - near highway, T. 11 N., R. 7 E., Sec. 20. | <i>R. cruentum</i> | 30 | Fair | Sugar pine on slopes near by | Benedict Harris | 9/21/30 |
| Lewis Creek - tributary of Salmon River near highway, T. 11 N., R. 7 E., Sec. 28. | <i>R. cruentum</i> | 10 | Fair | Sugar pine on slopes near by | Benedict Harris | 9/21/30 |
| Sauerkraut Creek, tributary of Salmon River - near highway, T. 11 N., R. 7 E., Sec. 34. | <i>R. cruentum</i> | 10 | Fair | Sugar pine on slopes near by | Benedict Harris | 9/21/30 |
| Rogers Creek, near highway above Orleans, T. 12 N., R. 6 E., Sec. 10. | <i>R. cruentum</i> | 10 | Fair | --- | Benedict Harris | 9/22/30 |
| Irving Creek - near highway, T. 12 N., R. 5 E., Sec. 3. | <i>R. cruentum</i> | 5 | Good | --- | Benedict Harris | 9/22/30 |
| Swilupp Creek - near highway, T. 14 N., R. 5 E., Sec. 10. | <i>R. cruentum</i> | 10 | Poor | --- | Benedict Harris | 9/22/30 |
| Clear Creek - Pick-aw-ish Camp Ground near highway, T. 15 N., R. 7 E., Sec. 7. | <i>R. cruentum</i> | 25 | Very Good | Sugar pine reproduction up Elk Creek. | Benedict Harris | 9/22/30 |
| Elk Creek - near Happy Camp, T. 16 N., R. 7 E., Sec. 15. | <i>R. cruentum</i> | 15 | Good | Sugar pine reproduction. | Benedict Harris | 9/22/30 |
| Several points along Indian Creek. No specific locations given. | <i>R. bracteosum</i> | 10 | Good | --- | Benedict Harris | 9/23/30 |
| At points along Indian Creek, T. 17 N., R. 11 W., Secs. 9 and 15. | <i>R. cruentum</i> | 35 | Good | Sugar pine reproduction in flats near creek. | Benedict Harris | 9/23/30 |
| In T. 18 N., R. 6 E., Secs. 8 and 9 above sugar pine range on Siskiyou summit. Up Indian Creek. | <i>R. lacustre</i> | 10 | Poor | Good stand of sugar pine on Poker Flat. | Benedict Harris | 9/23/30 |
| | <i>R. sanguineum</i> | 15 | | | | |
| | <i>R. binominatum</i> | 15 | | | | |
| | <i>R. marshallii</i> | 7 | | | | |
| | <i>R. lobbi</i> | 20 | | | | |
| Up Selad River about 6 mi. T. 47 N., R. 11 W., Sec. 29. | <i>R. cruentum</i> | 10 | Good | Scattered sugar pine chiefly reproduction along stream. | Benedict Harris | 9/23/30 |
| At Diablo Mer. | <i>R. lobbi</i> | 25 | | | Harris | |
| At Mill Creek near Scott Bar. T. 45 N., R. 10 W., Sec. 14. | <i>R. cruentum</i> | 30 | Good | Sugar pine along slopes. | Benedict Harris | 9/24/30 |
| | <i>R. lobbi</i> | 20 | | | Harris | |
| Up Horse Creek - West Fork. T. 47 N., R. 10 W., into R. 11 W. and to summit of mountains. | <i>R. viscosissimum</i> | 10 | Fair | Ribes not abundant in sugar pine type. | Benedict Harris | 9/27/30 |
| | <i>R. lobbi</i> | 15 | | | | |
| | <i>R. cruentum</i> | 45 | | | | |
| | <i>R. lacustre</i> | 10 | | | | |
| West of Hilt along Hinery Creek. T. 48 N., R. 8 W., Sec. 9 and 10. | <i>R. lacustre</i> | 10 | Very good | Ribes numerous along streams and old burns. | Benedict Harris | 9/25/30 |
| | <i>R. klamathense</i> | 25 | | | | |
| | <i>R. cruentum</i> | 45 | | | | |
| | <i>R. lobbi</i> | 10 | | | | |
| Vicinity Copco Lake. T. 47 N., R. 4 W., Secs. 2 and 4 along highway. | <i>R. sanguineum</i> | 10 | Fair | Ribes along streams. | Benedict Harris | 9/25/30 |
| Near Beaswick, along streams. T. 48 N., R. 3 W. | <i>R. klamathense</i> | 20 | Fair | R. klamathense along streams. R. velutinum on slopes. | Benedict Harris | 9/25/30 |
| Several points along Little Shasta River, T. 45 N., R. 3 W., Secs. 6 and 9. Near highway. | <i>R. cerum</i> | 20 | Good | Pines scattered | Benedict Harris | 9/26/30 |
| | <i>R. klamathense</i> | 30 | | | | |

*By "Pine Association" is meant the distance from Ribes to pines according to the following legend:

Excellent - Pines within 100 feet.

Fair - Pines 501 to 1,000 feet distant.

Very good - Pines 101 to 250 feet distant.

Poor - Pines 1,001 to 1,500 feet distant.

Good - Pines 251 to 500 feet distant.

Very poor - Pines over 1,500 feet distant.



On the Klamath National Forest, on which a great number of inspections were made, Benedict sums up the situation thus: "In general, Ribes are not abundant in sugar pine type. They are, however, numerous in patches above and below the altitudinal range of sugar pine. R. cereum was the most abundant and widely distributed Ribes species noted. R. lacustre, R. sanguineum and R. lobbi were also numerous. Very little typical Ribes stream type was noted. Ribes generally are more abundant along flats, roads and lower slopes above stream bed."

The presence of the Ribes in the Klamath National Forest is of sufficient importance to be mentioned here. The gradual termination of the black currant project, has obviously resulted in a less active educational campaign, particularly on this phase of the work. The trend of activities has been of a general nature and disseminated over the state as a whole.

A. Panel Exhibits.

The 5-panel exhibit which proved so satisfactory on the black currant work still retains a place of value as a nucleus for small fair exhibits. It occasionally fills a want when something is desired for a window display. One was placed in the window of the agricultural commissioner's office in Sonoma for two weeks during the past summer.

B. Blister Rust Film.

Since the use of the old blister rust film has been abandoned as an educational feature, the thought of replacing it with a smaller film resolved itself into a "tryout" with a Cine-Kodak. A camera was borrowed from a local firm and some "shots" taken of the California work. Considerable experience and development of technic are required before satisfactory pictures can be obtained. It is almost essential that the camera be in the hands of a professional photographer. It must be admitted that the use of this small film in the educational field is restricted. It may be that it will not fit into the general scheme of educational work now felt to be most essential. Only before small groups particularly interested in the prosecution of blister rust work does it seem to have possibilities. Further work is needed in this small film endeavor.

C. Exhibits.

Blister rust demonstrations were set up at the State Fair in Sacramento, the Nevada State Fair at Reno, the Del Norte County Fair in Crescent City and the California Flower Festival at San Leandro. Specimens in Riker mounts were given to the Santa Barbara Museum at Santa Barbara and the San Diego Museum in San Diego.

In the almost total forest, on which a great number of
 insectivorous birds, especially those of the *Alcedo* group, are
 abundant. They are, however, numerous
 in patches above and below the mountainous ridges of
 the *Alcedo* group. The most abundant and widely distributed birds are
 noted. *H. laticauda*, *H. laticauda* and *H. laticauda* are
 very little typical birds of the type and noted. Birds generally are
 more abundant along the ridge and lower slopes above stream bed.

EDUCATIONAL WORK

The general termination of the black current project, has
 resulted in a less active educational campaign, particularly in
 this phase of the work. The trend of activities has been of a general
 nature and disseminated over the state as a whole.

A. Local Exhibits.

The 2-panel exhibit which proved so satisfactory in the past
 current work still retains a place of value as a medium for small local
 exhibits. It occasionally fills a gap when something is desired for a
 window display. One was placed in the window of the animal hospital
 Commissioner's office in January for the month of the past winter.

B. Higher Grade Film.

Since the use of the old film has been abandoned
 as an educational feature, the thought of replacing it with a similar
 film resolved itself into a "problem" with a time-table. A desire was
 borrowed from a local firm and some "spots" taken of the University work.
 Considerable experience and development of technique are required before
 satisfactory pictures can be obtained. It is almost impossible to get the
 camera in the hands of a professional photographer. It must be
 admitted that the use of this small film in the educational field is
 restricted. It may be that it will not fit into the general scheme of
 educational work now being so much restricted. Only before small groups
 particularly interested in the presentation of higher grade work than is
 now in the possibilities. Further work is needed in this field.
 endeavor.

C. Exhibits.

After two commissions were sent out to the State Fair in
 Sacramento, the Nevada State Fair at Reno, the San Joaquin County Fair
 in Crescent City and the California Flower Festival at San Francisco.
 Specimens in higher amounts were given to the Santa Barbara Museum at Santa
 Barbara and the San Diego Museum in San Diego.

Under this heading may be included the educational sets which were left at seven colleges or universities and four normal schools or State Teachers' Colleges. There are several more of these institutions which will receive these sets in the near future. These sets have been received with considerable enthusiasm and interest.

D. Letters and Articles.

The presence of the rust in southwestern Oregon at the end of 1929 was of sufficient importance and interest to inform several groups directly or indirectly connected with blister rust control. Formal letters were sent to the rangers of the seven northern National Forests through their respective supervisors. The letter took the following form:

My dear Sir:

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY
Cooperating with
State Department of Agriculture
State Board of Forestry
College of Agriculture, University of California

To the Ranger:

The presence of the white pine blister rust in southwestern Oregon less than 50 miles from the California line makes it a potential menace to the sugar pine of California. This point in Oregon is over 100 miles farther south than the last known infection. It is not unlikely that the rust will make its appearance in this state this year. Fifty miles is not a long jump for this disease to make.

Considerable scouting will be done in northern California this season by the Office of Blister Rust Control. You can materially aid by keeping a close watch on currants, gooseberries and five-needled pines in your district. The rust appears on the pines in the spring and on currant and gooseberry leaves in the late summer or early fall.

Blister rust literature is being sent you, together with specimens, so that you may more easily identify suspicious material. Notify your supervisor and send in specimens if you suspect this disease. You may be the first to find it in California.

Thanking you for your cooperation, I am

Very respectfully yours,

(s) G. A. Root
Assistant Pathologist

[illegible]

[Faint handwritten text at the bottom of the page]

[illegible]

RECEIVED BY THE SECRETARY OF THE ARMY

1990

His is not a new idea.

State Department of

1890

1946

College of Agriculture, University of California

To the Manager:

[illegible]

1. The first of these is the fact that the majority of the population of the United States is of European descent. This is a fact which has been recognized by the government and the people of the United States for many years. It is a fact which has been recognized by the government and the people of the United States for many years.

may be the first to find it in California
your apartment and used in accordance is a
inmate, and that you may wish to identify
missed your library in being sent out with

10. The following information is for your information only:

1900

...and the

Assistant Pathologist

A letter was sent to the Farm Advisors of the state, telling of the status of the rust.

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY

An article, "Cooperating with"

State Department of Agriculture

State Board of Forestry

College of Agriculture, University of California

1914.

THE STATUS OF THE WHITE PINE BLISTER RUST AT THE END OF 1929.

The year of 1929 was marked with one or more important features relative to the spread of disease. Perhaps the most significant of these was the discovery of the rust on wild currants in Curry County, Oregon. Two infections were found - seven and fifteen miles respectively south of Port Orford. This represents a substantial expansion in the southward spread of the disease on the coast, being less than fifty miles from the Oregon-California line. The southernmost infection previous to this was fully one hundred miles to the north.

In the Cascade region the rust is gradually spreading southward. Current infection was found just northwest of Bend, a point about one hundred miles south of the Columbia River. Pine infection is thoroughly established in the Mt. Hood region.

The coast infections lead one to believe that the time is not far distant when the rust will be found in California - perhaps this year. Scouting for the disease in Del Norte County this year revealed no signs of the rust. Thorough search will be made next year in that territory contiguous to Oregon. The stage has been reached where the California sugar pine will be the next of commercial white pines to become attacked by this disease. We already have the eastern white pine and Idaho or western white pine infected in certain areas of their natural range.

The above information is left with you so you may answer certain questions which may arise concerning this disease. In your travels throughout your county, the opportunity may arise where you can help in this forest conservation measure.

Thanking you for your past cooperation, I am

Very respectfully yours,

(s) G. A. Root

State Leader in Blister Rust Control

A letter was sent to the same address of the same nature
of the status of the trust.

REPORT OF THE TRUSTEES OF THE TRUST
FOR THE YEAR 1928

Respectfully,
State Department of Agriculture
State Board of Forestry

Office of Forestry, University of California

THE STATUS OF THE TRUST FOR THE YEAR 1928

The year of 1928 was marked with one or more important features
relative to the status of the trust. During the year the Board of Forestry
has been endeavoring to bring about a more complete and accurate
Two allocations were made - one to the State Board of Forestry and
Fort Ord. This represents a substantial increase in the amount
of the trust. The year 1928 was also the
Oregon-California line. The California allocation provided for this was
fully one hundred miles to the north.

In the Oregon region the trust is probably somewhat
increased. The Board of Forestry has been endeavoring to
bring about a more complete and accurate
allocation of the trust. The Oregon allocation is
approximately 100 miles to the north.

The Board of Forestry has been endeavoring to
bring about a more complete and accurate
allocation of the trust. The Oregon allocation is
approximately 100 miles to the north. The
allocation for the Oregon region is
approximately 100 miles to the north. The
allocation for the Oregon region is
approximately 100 miles to the north.

The above information is being sent to you for your
information. It is not intended to be a
statement of fact, but rather a statement
of the Board of Forestry's opinion.

Respectfully,
Very respectfully yours,

(S. L. L.)
State Board of Forestry

An item of a similar nature was incorporated in a Confidential News Letter of the State Department of Agriculture which reaches all County Agricultural Commissioners and Inspectors.

An article, "The Status of the White Pine Blister Rust in the West," was put in the July issue of the Monthly Bulletin of the State Department of Agriculture. One newspaper release concerning the status of the rust this year reached a chain of one hundred or more papers throughout the state. During 1931, the studies were continued on the forest, which is in the north of the Black Rock Forest.

5. Talks.

Two talks were given during this year, one on blister rust before a group of Agricultural Commissioners at Strawberry, the scene of the current year's work, and another one on forestry conservation broadcast from station K.F.W., at Sacramento, under the auspices of the State Department of Agriculture.

RECOMMENDATIONS

In general, the different phases of blister rust work which have been carried on during 1930 should be continued in 1931. Constant "follow-up" work on the black currant situation is in order. Intensive scouting, particularly in the northern part of the state, should take the form of a well organized program. The proximity of the rust to the two Government nurseries in Idaho and Washington respectively should bring to mind the necessity of the sanitation of nurseries in California, private or otherwise, before the rust is near them. Chemical investigations should be continued, as well as ecological studies. Some experimental re-eradication should be done, and possibly some work on new areas in some of the National Forests. Protection of one or more of the National Parks should receive consideration. The educational work, besides dealing directly with blister rust, should sound a note of general conservation of forest resources with some stress laid upon the value of sugar pine, which are they located?

An expression of thanks is due the various cooperative agencies and those who have contributed a whole-hearted cooperation in the conduct of the work during 1930.

What is the effect on the number of new plants of reseeded areas after the first year's logging?

What is the effect of fire, clear cutting, and partial cutting on the growth of new plants?

RIBES ECOLOGY, CALIFORNIA

By

F. A. Patty
Assistant Pathologist

II. Are conditions of

of Ribes?

INTRODUCTION

Studies upon the ecology of Ribes were begun in the commercial sugar pine regions of the Stanislaus National Forest, California in 1928 and were continued on the same forest during the summers of 1929 and 1930. In addition, during 1930, the studies were extended to the Sierra National Forest, which is to the south of the Stanislaus National Forest.

PURPOSE

The purpose of a Ribes ecology project in California is to make a comprehensive study of the Ribes of the sugar pine region to determine the factors governing their occurrence and the application of such information in preparing a program of blister rust control for the region.

The main objectives of the studies undertaken will be to answer the following questions concerning the principal Ribes species of the region:

1. Does Ribes seed remain in soil or duff under storage conditions?
2. Does old stored seed or fairly fresh seed produce the young plants?
3. How long before the young plants begin to produce fruit?
4. How soon after logging do new plants appear?
5. Do birds and rodents play an important role in the distribution of Ribes seed?
6. If Ribes seeds are present in the soil of mature timber, in what part of the duff are they located?
7. Does the duff act as a refrigerating agent in preventing the germination of Ribes seed until a disturbance breaks the refrigerating effect?
8. What is the effect on the number of new plants, of removing the veteran Ribes just prior to logging?
9. What is the effect of fire, clear cutting and partial cutting on the production of new plants?

5

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION
PUBLISHED WEEKLY
CHICAGO, ILL., U.S.A.

• 678 • 380704

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The purpose of a Ribes school project in California is to

of the same character as the one to be destroyed and the

2. What is the effect on the number of members of the veterans' clubs after the legislation?

the production of new plants? What is the extent of this, clear cutting and partial cutting?

10. How long do new Ribes continue to appear on an area following logging? How fast do they grow?

11. Are conditions on dry sites favorable for germination and survival of Ribes?

12. Do bushes in the mature stands of timber bear good crops of seeds?

This information would assist the eradication forces to plan a systematic Ribes eradication program for an area. Definite knowledge of all or a number of these points would provide partial information as to the best time to perform eradication with respect to logging, before or after logging and how long before or after; and when subsequent eradications should be made.

The information might be of value to the forester in shaping his management plan. If the costs of permanently suppressing Ribes on a partially cut area were economically feasible, and on the other hand if the suppression costs were found to be prohibitive on a clear-cut area, the forester would probably practice partial cutting if he planned to continue on a sustained yield basis.

for a record of the land

METHODS USED

The studies and plots are grouped under two main heads, namely, permanent and temporary. The methods which have been used in the various studies vary somewhat, so brief description will be made for each one as it is taken up in this report.

The following is a list of the studies now in progress:

Permanent Plots and Studies

- A. The effect of different types of logging on Ribes regeneration.
- B. The rate of Ribes re-establishment in sugar pine-yellow pine and sugar pine-fir types following logging.
- C. The rate of Ribes re-establishment on stream types following logging.
- D. Studies to determine the year in which the greatest number of Ribes appear following an initial eradication.
- E. The effect of the removal of various parts of the Ribes plant on regeneration.
- F. The effect of various soil disturbances on Ribes germination for different exposures.

[illegible]

11. The conditions on the above Certificate for Government and the

13. In places where the ground is not so hard as in the places where the ground is hard, the ground is not so hard as in the places where the ground is hard.

indications should be made.

the forest was economically feasible, and on the other hand, if the application was found to be prohibitive on a small scale, the forest would probably grow in greater abundance in the future in connection with a stabilized price.

U.S. GOVERNMENT PRINTING OFFICE: 1967 O - 380-150

The above information was obtained from the files of the FBI, New York Office, dated 10-18-67.

[illegible]

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific information required.

1-10-1944

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

1. Review of information has been in which the following are listed:

... the fact that it is a condition of the law of the land that the Government...

different exposures.

G. Ribes growth studies on the Cow Creek plot.

H. The influence of moisture on the germination and survival of Ribes on dry sites.

Temporary Studies

A. Duff analysis for seed storage.

B. Strip transect studies, Sierra National Forest, 1930.

RESULTS PERMANENT PLOTS AND STUDIES

A. The Effect of Different Types of Logging on Ribes Regeneration.

1. Purpose of study. The purpose of this study is to determine the rate of establishment of Ribes on areas where Forest Service cutting methods have been practiced for the past twenty years.

2. Methods used. In 1910 two 20-acre plots were established by the Forest Service and cut under their supervision. The Ribes were eradicated in this locality in 1926, although no record was kept of the number of bushes or the feet of live stem removed for the plots. However, there is a record of the number of Ribes per acre which were found on the block into which these two plots fall.

The residual stand of mature timber was removed from Plot No. 1 in 1928, leaving only a very few mature trees, the reproduction, and most of the brush. Exceptional care was exercised in logging not to disturb the reproduction. As a result, a minimum amount of ground disturbance was created.

Plot No. 2 was not logged the second time. Conditions on the two plots are quite comparable. However, a small creek runs through the end of Plot No. 2.

Both plots are located in sugar pine-yellow pine type on gentle slopes which are well covered with brush.

During the latter part of the summer of 1930, both of these plots were carefully checked, and data were taken on the number of Ribes, feet of live stem, and the number of fruits present at the time of checking.

1. The influence of moisture on the germination and survival of Ribes
2. Ribes growth studies in the San Pedro area.

20150727 15:00:00

A full analysis for seed storage.

[illegible][illegible]

A. The Effect of Distance from the Source of the Noise.

1. Purpose of study. The purpose of this study is to determine the rate of establishment of these weevils when larvae are released into the field.

Look into which these two plots fall.

1. The first of these is the fact that the majority of the population of the United States is of European descent. This is a fact which has been recognized by the government and the people of the United States for many years. It is a fact which has been recognized by the government and the people of the United States for many years.

1. The first of these is the fact that the
2. second of these is the fact that the
3. third of these is the fact that the
4. fourth of these is the fact that the
5. fifth of these is the fact that the
6. sixth of these is the fact that the
7. seventh of these is the fact that the
8. eighth of these is the fact that the
9. ninth of these is the fact that the
10. tenth of these is the fact that the

Some of the above are located in major black-poll areas and some are located in areas with black-poll.

During the latter part of the summer of 1941, both of these
 these were carefully checked, and have remained on the order of 100
 feet of live stem, and the number of live stems at the time of the

TABLE NO. 1

RIBES ESTABLISHMENT ON FOREST SERVICE CUTTING AREAS, SE-Y2 TYPE

| Plot No. 1 | | | | | Plot No. 2 | | | | |
|---------------------|------------------------|----------------------|------------------------|---------|------------------------|----------------------|------------------------|------------------------------|------------------------|
| Ribes roezli | | | | | Ribes roezli | | | | |
| Age of
Bushes | Number
of
Bushes | Feet
Live
Stem | Number
of
Fruits | A. nev. | Number
of
Bushes | Feet
Live
Stem | Number
of
Fruits | Number
of
Live
Stem | Number
of
Fruits |
| Old
bushes | 27.0 | 1,025.0 | 174.0 | - | 56.0 | 1,064.0 | 131.0 | 29.0 | 237.0 |
| 2 years | 1.0 | 8.0 | - | - | - | - | - | 1.0 | 3.0 |
| 1 year | - | - | - | - | 2.0 | 1.0 | - | 2.0 | 2.0 |
| Seedling | - | - | - | - | - | - | - | 17.0 | - |
| Totals | 28.0 | 1,033.0 | 174.0 | - | 58.0 | 1,065.0 | 131.0 | 49.0 | 242.0 |
| Average
per acre | 1.4 | 51.6 | 8.7 | - | 2.9 | 53.2 | 6.9 | 2.4 | 12.1 |

Plot No. 1 - Cut over in 1915.

Ribes eradicated in 1926.

Residual timber cut in
1928.

Ribes checked in 1930.

Plot No. 2 - Cut over in 1910.

Ribes eradicated in 1926.

Ribes checked in 1930.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|

able reason the
of the fruiting
for seeds at

es Re-establish
Types following

study. The pur

ed. Previous to
near pine-flir to

removed.

2. Needles observed in the area of the stream. The needles are found in the stream bed and on the shore. The needles are found in the stream bed and on the shore. The needles are found in the stream bed and on the shore.

The probable reason for the needles being found in the stream bed and on the shore is that in 1935 most of the needles were scattered and on the shore there are very few needles found in the soil.

3. The rate of decay of needles in the stream bed and on the shore is very slow. The needles are found in the stream bed and on the shore.

4. Purpose of study. The purpose of this study is to determine the rate of decay of needles in the stream bed and on the shore. The needles are found in the stream bed and on the shore.

5. Methods used. The needles were found in the stream bed and on the shore. The needles were found in the stream bed and on the shore. The needles were found in the stream bed and on the shore.

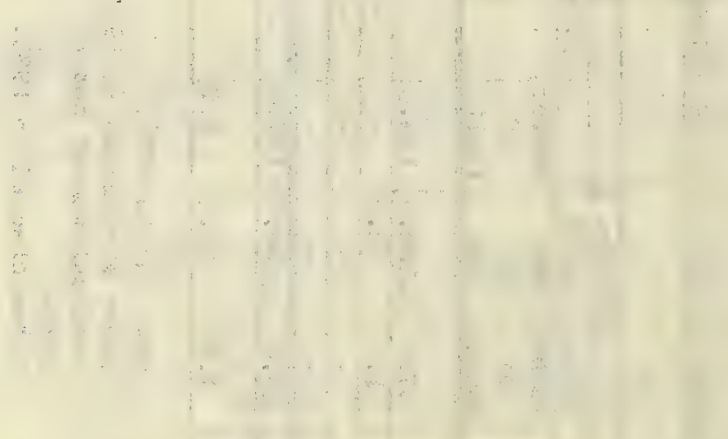


TABLE NO. 2

THE RATE OF RIBES RE-ESTABLISHMENT IN SUGAR PINE-YELLOW PINE AND SUGAR PINE-FIR TYPES
FOLLOWING LOGGING

| | Plot No. 1 | | | | | Plot No. 2 | | | | | Plot No. 3 | | | | | Plot No. 4 | | | | |
|-----------------------------|-------------------------------------|--------------------|------------------------|------------------------|-------------------------|---------------------------------|--------------------|------------------------|------------------------|-------------------------|---|--------------------|------------------------|------------------------|-------------------------|---|--------------------|------------------------|------------------------|-------------------------|
| | Sugar Pine-Fir Ribes Not eradicated | | | | | Sugar Pine-Fir Ribes eradicated | | | | | Sugar Pine-Yellow Pine Ribes eradicated | | | | | Sugar Pine-Yellow Pine Ribes Not eradicated | | | | |
| | Number Bushes Per Acre | Live Stem Per Acre | Number Fruits Per Acre | Number Bushes Per Acre | Feet Live Stem Per Acre | Number Bushes Per Acre | Live Stem Per Acre | Number Fruits Per Acre | Number Bushes Per Acre | Feet Live Stem Per Acre | Number Bushes Per Acre | Live Stem Per Acre | Number Fruits Per Acre | Number Bushes Per Acre | Feet Live Stem Per Acre | Number Bushes Per Acre | Live Stem Per Acre | Number Fruits Per Acre | Number Bushes Per Acre | Feet Live Stem Per Acre |
| Bushes Found Before Logging | 43 | 342 | 126 | 56 | 814 | 152 | 20 | 251 | 24 | 32 | 210 | 58 | | | | | | | | |
| Bushes Found After Logging | 16* | 147 | 56 | 5* | 16 | 10 | 5 | 84 | - | 26 | 216 | 53 | | | | | | | | |

All the bushes listed in this table (except 2) were present before logging.
*One of the bushes was a 1932 seedling.

REPORT ON THE PROGRESS OF THE RESEARCH WORK DURING THE YEAR 1900

BY J. H. ...

| 1. 1900 | | 2. 1901 | | 3. 1902 | | 4. 1903 | |
|---------|--------|-------------|--------|---------|--------|---------|-------|
| No. | Date | Description | Amount | Balance | Total | Total | Total |
| | | | | | | | |
| 1001 | Jan 1 | Balance | 100.00 | | 100.00 | | |
| 1002 | Jan 15 | ... | ... | ... | ... | ... | ... |
| 1003 | Jan 30 | ... | ... | ... | ... | ... | ... |
| 1004 | Feb 1 | ... | ... | ... | ... | ... | ... |
| 1005 | Feb 15 | ... | ... | ... | ... | ... | ... |
| 1006 | Feb 28 | ... | ... | ... | ... | ... | ... |
| 1007 | Mar 1 | ... | ... | ... | ... | ... | ... |
| 1008 | Mar 15 | ... | ... | ... | ... | ... | ... |
| 1009 | Mar 31 | ... | ... | ... | ... | ... | ... |
| 1010 | Apr 1 | ... | ... | ... | ... | ... | ... |
| 1011 | Apr 15 | ... | ... | ... | ... | ... | ... |
| 1012 | Apr 30 | ... | ... | ... | ... | ... | ... |
| 1013 | May 1 | ... | ... | ... | ... | ... | ... |
| 1014 | May 15 | ... | ... | ... | ... | ... | ... |
| 1015 | May 31 | ... | ... | ... | ... | ... | ... |
| 1016 | Jun 1 | ... | ... | ... | ... | ... | ... |
| 1017 | Jun 15 | ... | ... | ... | ... | ... | ... |
| 1018 | Jun 30 | ... | ... | ... | ... | ... | ... |
| 1019 | Jul 1 | ... | ... | ... | ... | ... | ... |
| 1020 | Jul 15 | ... | ... | ... | ... | ... | ... |
| 1021 | Jul 31 | ... | ... | ... | ... | ... | ... |
| 1022 | Aug 1 | ... | ... | ... | ... | ... | ... |
| 1023 | Aug 15 | ... | ... | ... | ... | ... | ... |
| 1024 | Aug 31 | ... | ... | ... | ... | ... | ... |
| 1025 | Sep 1 | ... | ... | ... | ... | ... | ... |
| 1026 | Sep 15 | ... | ... | ... | ... | ... | ... |
| 1027 | Sep 30 | ... | ... | ... | ... | ... | ... |
| 1028 | Oct 1 | ... | ... | ... | ... | ... | ... |
| 1029 | Oct 15 | ... | ... | ... | ... | ... | ... |
| 1030 | Oct 31 | ... | ... | ... | ... | ... | ... |
| 1031 | Nov 1 | ... | ... | ... | ... | ... | ... |
| 1032 | Nov 15 | ... | ... | ... | ... | ... | ... |
| 1033 | Nov 30 | ... | ... | ... | ... | ... | ... |
| 1034 | Dec 1 | ... | ... | ... | ... | ... | ... |
| 1035 | Dec 15 | ... | ... | ... | ... | ... | ... |
| 1036 | Dec 31 | ... | ... | ... | ... | ... | ... |
| 1037 | Jan 1 | ... | ... | ... | ... | ... | ... |
| 1038 | Jan 15 | ... | ... | ... | ... | ... | ... |
| 1039 | Jan 31 | ... | ... | ... | ... | ... | ... |
| 1040 | Feb 1 | ... | ... | ... | ... | ... | ... |
| 1041 | Feb 15 | ... | ... | ... | ... | ... | ... |
| 1042 | Feb 28 | ... | ... | ... | ... | ... | ... |
| 1043 | Mar 1 | ... | ... | ... | ... | ... | ... |
| 1044 | Mar 15 | ... | ... | ... | ... | ... | ... |
| 1045 | Mar 31 | ... | ... | ... | ... | ... | ... |
| 1046 | Apr 1 | ... | ... | ... | ... | ... | ... |
| 1047 | Apr 15 | ... | ... | ... | ... | ... | ... |
| 1048 | Apr 30 | ... | ... | ... | ... | ... | ... |
| 1049 | May 1 | ... | ... | ... | ... | ... | ... |
| 1050 | May 15 | ... | ... | ... | ... | ... | ... |
| 1051 | May 31 | ... | ... | ... | ... | ... | ... |
| 1052 | Jun 1 | ... | ... | ... | ... | ... | ... |
| 1053 | Jun 15 | ... | ... | ... | ... | ... | ... |
| 1054 | Jun 30 | ... | ... | ... | ... | ... | ... |
| 1055 | Jul 1 | ... | ... | ... | ... | ... | ... |
| 1056 | Jul 15 | ... | ... | ... | ... | ... | ... |
| 1057 | Jul 31 | ... | ... | ... | ... | ... | ... |
| 1058 | Aug 1 | ... | ... | ... | ... | ... | ... |
| 1059 | Aug 15 | ... | ... | ... | ... | ... | ... |
| 1060 | Aug 31 | ... | ... | ... | ... | ... | ... |
| 1061 | Sep 1 | ... | ... | ... | ... | ... | ... |
| 1062 | Sep 15 | ... | ... | ... | ... | ... | ... |
| 1063 | Sep 30 | ... | ... | ... | ... | ... | ... |
| 1064 | Oct 1 | ... | ... | ... | ... | ... | ... |
| 1065 | Oct 15 | ... | ... | ... | ... | ... | ... |
| 1066 | Oct 31 | ... | ... | ... | ... | ... | ... |
| 1067 | Nov 1 | ... | ... | ... | ... | ... | ... |
| 1068 | Nov 15 | ... | ... | ... | ... | ... | ... |
| 1069 | Nov 30 | ... | ... | ... | ... | ... | ... |
| 1070 | Dec 1 | ... | ... | ... | ... | ... | ... |
| 1071 | Dec 15 | ... | ... | ... | ... | ... | ... |
| 1072 | Dec 31 | ... | ... | ... | ... | ... | ... |
| 1073 | Jan 1 | ... | ... | ... | ... | ... | ... |
| 1074 | Jan 15 | ... | ... | ... | ... | ... | ... |
| 1075 | Jan 31 | ... | ... | ... | ... | ... | ... |
| 1076 | Feb 1 | ... | ... | ... | ... | ... | ... |
| 1077 | Feb 15 | ... | ... | ... | ... | ... | ... |
| 1078 | Feb 28 | ... | ... | ... | ... | ... | ... |
| 1079 | Mar 1 | ... | ... | ... | ... | ... | ... |
| 1080 | Mar 15 | ... | ... | ... | ... | ... | ... |
| 1081 | Mar 31 | ... | ... | ... | ... | ... | ... |
| 1082 | Apr 1 | ... | ... | ... | ... | ... | ... |
| 1083 | Apr 15 | ... | ... | ... | ... | ... | ... |
| 1084 | Apr 30 | ... | ... | ... | ... | ... | ... |
| 1085 | May 1 | ... | ... | ... | ... | ... | ... |
| 1086 | May 15 | ... | ... | ... | ... | ... | ... |
| 1087 | May 31 | ... | ... | ... | ... | ... | ... |
| 1088 | Jun 1 | ... | ... | ... | ... | ... | ... |
| 1089 | Jun 15 | ... | ... | ... | ... | ... | ... |
| 1090 | Jun 30 | ... | ... | ... | ... | ... | ... |
| 1091 | Jul 1 | ... | ... | ... | ... | ... | ... |
| 1092 | Jul 15 | ... | ... | ... | ... | ... | ... |
| 1093 | Jul 31 | ... | ... | ... | ... | ... | ... |
| 1094 | Aug 1 | ... | ... | ... | ... | ... | ... |
| 1095 | Aug 15 | ... | ... | ... | ... | ... | ... |
| 1096 | Aug 31 | ... | ... | ... | ... | ... | ... |
| 1097 | Sep 1 | ... | ... | ... | ... | ... | ... |
| 1098 | Sep 15 | ... | ... | ... | ... | ... | ... |
| 1099 | Sep 30 | ... | ... | ... | ... | ... | ... |
| 1100 | Oct 1 | ... | ... | ... | ... | ... | ... |
| 1101 | Oct 15 | ... | ... | ... | ... | ... | ... |
| 1102 | Oct 31 | ... | ... | ... | ... | ... | ... |
| 1103 | Nov 1 | ... | ... | ... | ... | ... | ... |
| 1104 | Nov 15 | ... | ... | ... | ... | ... | ... |
| 1105 | Nov 30 | ... | ... | ... | ... | ... | ... |
| 1106 | Dec 1 | ... | ... | ... | ... | ... | ... |
| 1107 | Dec 15 | ... | ... | ... | ... | ... | ... |
| 1108 | Dec 31 | ... | ... | ... | ... | ... | ... |
| 1109 | Jan 1 | ... | ... | ... | ... | ... | ... |
| 1110 | Jan 15 | ... | ... | ... | ... | ... | ... |
| 1111 | Jan 31 | ... | ... | ... | ... | ... | ... |
| 1112 | Feb 1 | ... | ... | ... | ... | ... | ... |
| 1113 | Feb 15 | ... | ... | ... | ... | ... | ... |
| 1114 | Feb 28 | ... | ... | ... | ... | ... | ... |
| 1115 | Mar 1 | ... | ... | ... | ... | ... | ... |
| 1116 | Mar 15 | ... | ... | ... | ... | ... | ... |
| 1117 | Mar 31 | ... | ... | ... | ... | ... | ... |
| 1118 | Apr 1 | ... | ... | ... | ... | ... | ... |
| 1119 | Apr 15 | ... | ... | ... | ... | ... | ... |
| 1120 | Apr 30 | ... | ... | ... | ... | ... | ... |
| 1121 | May 1 | ... | ... | ... | ... | ... | ... |
| 1122 | May 15 | ... | ... | ... | ... | ... | ... |
| 1123 | May 31 | ... | ... | ... | ... | ... | ... |
| 1124 | Jun 1 | ... | ... | ... | ... | ... | ... |
| 1125 | Jun 15 | ... | ... | ... | ... | ... | ... |
| 1126 | Jun 30 | ... | ... | ... | ... | ... | ... |
| 1127 | Jul 1 | ... | ... | ... | ... | ... | ... |
| 1128 | Jul 15 | ... | ... | ... | ... | ... | ... |
| 1129 | Jul 31 | ... | ... | ... | ... | ... | ... |
| 1130 | Aug 1 | ... | ... | ... | ... | ... | ... |
| 1131 | Aug 15 | ... | ... | ... | ... | ... | ... |
| 1132 | Aug 31 | ... | ... | ... | ... | ... | ... |
| 1133 | Sep 1 | ... | ... | ... | ... | ... | ... |
| 1134 | Sep 15 | ... | ... | ... | ... | ... | ... |
| 1135 | Sep 30 | ... | ... | ... | ... | ... | ... |
| 1136 | Oct 1 | ... | ... | ... | ... | ... | ... |
| 1137 | Oct 15 | ... | ... | ... | ... | ... | ... |
| 1138 | Oct 31 | ... | ... | ... | ... | ... | ... |
| 1139 | Nov 1 | ... | ... | ... | ... | ... | ... |
| 1140 | Nov 15 | ... | ... | ... | ... | ... | ... |
| 1141 | Nov 30 | ... | ... | ... | ... | ... | ... |
| 1142 | Dec 1 | ... | ... | ... | ... | ... | ... |
| 1143 | Dec 15 | ... | ... | ... | ... | ... | ... |
| 1144 | Dec 31 | ... | ... | ... | ... | ... | ... |
| 1145 | Jan 1 | ... | ... | ... | ... | ... | ... |
| 1146 | Jan 15 | ... | ... | ... | ... | ... | ... |
| 1147 | Jan 31 | ... | ... | ... | ... | ... | ... |
| 1148 | Feb 1 | ... | ... | ... | ... | ... | ... |
| 1149 | Feb 15 | ... | ... | ... | ... | ... | ... |
| 1150 | Feb 28 | ... | ... | ... | ... | ... | ... |
| 1151 | Mar 1 | ... | ... | ... | ... | ... | ... |
| 1152 | Mar 15 | ... | ... | ... | ... | ... | ... |
| 1153 | Mar 31 | ... | ... | ... | ... | ... | ... |
| 1154 | Apr 1 | ... | ... | ... | ... | ... | ... |
| 1155 | Apr 15 | ... | ... | ... | ... | ... | ... |
| 1156 | Apr 30 | ... | ... | ... | ... | ... | ... |
| 1157 | May 1 | ... | ... | ... | ... | ... | ... |
| 1158 | May 15 | ... | ... | ... | ... | ... | ... |
| 1159 | May 31 | ... | ... | ... | ... | ... | ... |
| 1160 | Jun 1 | ... | ... | ... | ... | ... | ... |
| 1161 | Jun 15 | ... | ... | ... | ... | ... | ... |
| 1162 | Jun 30 | ... | ... | ... | ... | ... | ... |
| 1163 | Jul 1 | ... | ... | ... | ... | ... | ... |
| 1164 | Jul 15 | ... | ... | ... | ... | ... | ... |
| 1165 | Jul 31 | ... | ... | ... | ... | ... | ... |
| 1166 | Aug 1 | ... | ... | ... | ... | ... | ... |
| 1167 | Aug 15 | ... | ... | ... | ... | ... | ... |
| 1168 | Aug 31 | ... | ... | ... | ... | ... | ... |
| 1169 | Sep 1 | ... | ... | ... | ... | ... | ... |
| 1170 | Sep 15 | ... | ... | ... | ... | ... | ... |
| 1171 | Sep 30 | ... | ... | ... | ... | ... | ... |
| 1172 | Oct 1 | ... | ... | ... | ... | ... | ... |
| 1173 | Oct 15 | ... | ... | ... | ... | ... | ... |
| 1174 | Oct 31 | ... | ... | ... | ... | ... | ... |
| 1175 | Nov 1 | ... | ... | ... | ... | ... | ... |
| 1176 | Nov 15 | ... | ... | ... | ... | ... | ... |
| 1177 | Nov 30 | ... | ... | ... | ... | ... | ... |
| 1178 | Dec 1 | ... | ... | ... | ... | ... | ... |
| 1179 | Dec 15 | ... | ... | ... | ... | ... | ... |
| 1180 | Dec 31 | ... | ... | ... | ... | ... | ... |
| 1181 | Jan 1 | ... | ... | ... | ... | ... | ... |
| 1182 | Jan 15 | ... | ... | ... | ... | ... | ... |
| 1183 | Jan 31 | ... | ... | ... | ... | ... | ... |
| 1184 | Feb 1 | ... | ... | ... | ... | ... | ... |
| 1185 | Feb 15 | ... | ... | ... | ... | ... | ... |
| 1186 | Feb 28 | ... | ... | ... | ... | ... | ... |
| 1187 | Mar 1 | ... | ... | ... | ... | ... | ... |
| 1188 | Mar 15 | ... | ... | ... | ... | ... | ... |
| 1189 | Mar 31 | ... | ... | ... | ... | ... | ... |
| 1190 | Apr 1 | ... | ... | ... | ... | ... | ... |
| 1191 | Apr 15 | ... | ... | ... | ... | ... | ... |
| 1192 | Apr 30 | ... | ... | ... | ... | ... | ... |
| 1193 | May 1 | ... | ... | ... | ... | ... | ... |
| 1194 | May 15 | ... | ... | ... | ... | ... | ... |
| 1195 | May 31 | ... | ... | ... | ... | ... | ... |
| 1196 | Jun 1 | ... | ... | ... | ... | ... | ... |
| 1197 | Jun 15 | ... | ... | ... | ... | ... | ... |
| 1198 | Jun 30 | ... | ... | ... | ... | ... | ... |
| 1199 | Jul 1 | ... | ... | ... | ... | ... | ... |
| 1200 | Jul 15 | ... | ... | ... | ... | ... | ... |

... and ...

3. Results obtained. Table No. 2 gives a summary of the Ribes conditions as they existed on the plots in 1929 previous to logging, and in 1930, one year after logging. The table brings out the point that only two new bushes appeared on the four plots in 1929 and 1930 in spite of the fact that plots No. 1 and 2 represent good potential Ribes sites. These data also show that a fair number of bushes per acre are left on an area after logging and that many of these old bushes are capable of producing fruit the year following the removal of the timber providing other conditions are favorable. Logging on these plots was carried on under the supervision of the Forest Service; hence, their standard cutting regulations were used.

The bushes which are shown as present after logging on plots 2 and 3 (from which the Ribes were eradicated) represent the ones that were missed during eradication.

C. The Rate of Ribes Re-establishment in Stream Type Following Logging.

1. Purpose of study. The purpose of this study is to determine the rate of Ribes re-establishment in stream type after logging.

2. Methods used. The plot was laid out in the spring of 1929 in uncut stream type. No check was made of the Ribes, although it was estimated at that time that they averaged about 75 per acre. It was not possible to take a census of the Ribes on the plot because the falling crews had begun work a few days after the preliminary check had been made. The old bushes were not bearing many fruits because a heavy late spring frost had killed most of the flowers and young shoots. Only a few bushes growing in protected places bore any fruits. During the latter part of August, 1930 this plot was carefully checked, data recorded and all of the bushes were removed.

TABLE NO. 3

REGENERATION OF RIBES IN STREAM TYPE

| Ribes Species | Ribes Per Acre | | | | Fast Live Stem Per Acre | | | |
|---------------|----------------|-------------|-------------|-------|-------------------------|-------------|-------------|-------|
| | Old Bushes | 1929 Bushes | 1930 Bushes | Total | Old Bushes | 1929 Bushes | 1930 Bushes | Total |
| R. raetzli | 14 | 7 | 230 | 251 | 212 | 23 | 57 | 292 |
| R. nevadense | 6 | 6 | 365 | 377 | 44 | 7 | 15 | 67 |
| R. cereum | 1 | 0 | 7 | 8 | 3 | 0 | 3 | 6 |
| Totals | 21 | 13 | 602 | 636 | 258 | 30 | 75 | 364 |

This area was logged in 1929. Approximately 75 Ribes per acre were present before logging.

3. Results obtained. Table No. 3 shows the number of bushes and feet of live stem found on the plot when the check was made. A few Ribes germinated in 1929, the year in which the area was logged, but a much larger number appeared in 1930. These data really have a great deal more significance when they are compared to the data in Table No. 2. A comparison of these tables indicates that stream type begins to produce an abundance of Ribes the year following logging, while sugar pine-fir and sugar pine-yellow pine type do not do so. However, more evidence will have to be obtained from other areas before a final conclusion can be made. Additional checks will be made every year to obtain a comparison on the rate of the regeneration of Ribes on the sugar pine-yellow pine, sugar pine-fir and stream types.

D. A Study to Determine the Year in Which the Greatest Number of Ribes Appear Following Eradication.

1. Purpose of study. This study was begun early in September, 1930 after the Ribes fruits had ripened, to determine how many years elapse after an eradication before the year of maximum germination is reached. Over a period of four or five years there is usually one season in which a large number of seeds germinate. This year is referred to as the "year of maximum germination". This particular site was selected because it was known that there were thousands of Ribes seed present on the plot. This was also considered an excellent site for Ribes due to the soil, moisture and shade conditions.

2. Methods used. On an area which was cut over in 1925, there were found to be about 60 acres coming back to R. roezli, R. nevadense, R. cereum and R. viscosissimum. This area averaged approximately 1,000 Ribes per acre with parts of it running as high as 1,500 per acre. Over 99 per cent of the Ribes were R. roezli bushes. A small plot of 1.6 acres where the concentration was the greatest was selected for this study.

The bushes were grubbed out and left on the ground where they were dug. The force of the grub hoe striking the bushes caused most of the ripened fruits to fall off under the bushes. Data were taken on the number and species of bushes, feet of live stem, and the number of fruits. Undoubtedly the results of the study will be influenced a little by Ribes seeds which may be transported into the plot from surrounding areas. Sufficient numbers will hardly be carried in, however, to affect the year of maximum germination because of the enormous number of seed already present.

3. Results obtained. The study has not been completed but is presented merely to show what a tremendous number of seeds may be produced by R. roezli under optimum conditions during a favorable seed year.

3. Stands selected. Table No. 3 shows the number of bushes and feet of live stems in the plot when the check was made. A few bushes were killed in 1907, the year in which the area was logged, but no larger number appeared in 1908. These data really have a great deal more significance than they are compared to the data in Table No. 2. A comparison of these tables indicates that sugar pine is the most abundant of these trees in the area, while sugar pine-fir and sugar pine-yellow pine type do not do so. However, more evidence will have to be obtained from other areas before a final conclusion can be made. Additional checks will be made every year to obtain a comparison on the basis of the regeneration of these on the sugar pine-yellow pine, sugar pine-fir and yellow pine types.

4. Study to determine the year in which the greatest number of bushes were killed following logging.

1. Purpose of study. This study was begun early in September, 1907, after the bushes had been killed, to determine how many bushes were killed after an earthquake before the year of maximum regeneration in the area. Over a period of four or five years there is usually one season in which a large number of bushes are killed. The year is selected as the year of maximum regeneration. This question also was selected because it was known that there were thousands of bushes killed in the plot. This was also considered an excellent site for study on the soil, vegetation and shade conditions.

2. Methods used. In an area which was cut over in 1907, there were found to be about 10 acres coming back to a small 1.5 acre plot. The area was divided into 100 equal parts of 1.5 acres each. A small plot of 1.5 acres was selected for this study.

The bushes were grouped and tall in the ground were kept very dry. The forest of the plot was striking and bushes were cut at the highest points to fall off under the ground. This was done on the ground and spaced at bushes, feet of live stems, and the number of bushes. Undoubtedly the results of the study will be interesting and useful. These results will be compared with the plot from surrounding areas. Different results will likely be obtained in the future, but the part of the study is important because of the number of bushes already present.

3. Results obtained. The study has been completed and is being sent early to show what a tremendous number of bushes were killed by logging under optimum conditions during a favorable year.

A total of 1,451 *R. roezli*, 23 *R. nevadense*, 1 *R. cereum* and 1 *R. viscosissimum* bushes were removed from the 1.6-acre plot. The *R. roezli* bushes contained 30,620 feet of live stem and 37,815 fruits. The 23 other *Ribes* were not producing fruit. It is estimated that the 1,451 *R. roezli* bushes produced 1,510,000 seeds in 1931. This estimate was obtained by multiplying the number of fruits by the figure 40 which proved to be the average number of seeds per fruit for 2,000 *R. roezli* fruits which were collected in the vicinity.

B. The Effect on Regeneration of the Removal of Various Parts of the Ribes Plant

1. Purpose of study. This study was started to determine the regenerative ability of *R. roezli*, (1) when aerial parts of the bush and crown are removed, (2) when the aerial portions only are removed, and (3) to ascertain the number of years necessary for the plant to again bear fruit.

2. Methods used. Bushes which are usually grouped quite closely together in sets of four were treated in the following manner: (1) the aerial portion was removed and the crown left exposed; (2) the aerial portion was removed and the crown covered with four inches of soil; (3) the aerial portion and crown were removed and the roots left exposed; (4) the aerial portion and crown were removed and the roots covered with four inches of soil. All of the bushes were quite vigorous and were bearing fruit when the treatments were made. Some of them were fairly well shaded, while others were well in the open. This study was started in the summer of 1929 and checked in the fall of 1930. Twenty-eight groups of bushes with four bushes in each group were treated as described above. Two additional studies with 128 bushes in each study were started in 1930.

3. Results obtained. Table No. 5 gives the results of the study. Under the conditions of this experiment it appears that the roots of *R. roezli* are unable to sprout if they are left in the soil. The three bushes which had sprouted from roots probably had a little crown tissue left on them. When crowns are left in the ground more than 50 per cent of them live. Too much emphasis cannot be placed on the results of this experiment until additional data are obtained.

Total of 1,431 *L. roosei*, 30 *L. setosus*, 1 *L. calvus* and

1 *L. ...* were removed from the 1.6-acre field.

1. *L. roosei* were removed as, 200 feet of live stem and 87,813 fruits.

It is estimated that the total number of *L. roosei* was 1,431. This estimate

was obtained by multiplying the number of fruits by the 1.6-acre

area, based on the average number of seeds per fruit of 1,000.

1. *L. roosei* fruits were collected in the vicinity.

1. The effect on regeneration of the removal of *L. roosei* fruits of

the 1.6-acre field was determined by comparing the number of

fruits of *L. roosei* in the field with the number of fruits of

the same species in the adjacent field.

1. *L. roosei* fruits were collected in the vicinity.

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1. *L. roosei* fruits were collected in the vicinity.

TABLE NO. 4

THE REGENERATIVE ABILITY OF ROOTS AND CRO AS OF R. HOLZLI

| Treatment Applied* | Number of Bushes | Total Feet of Live Stem | Bushes Surviving | Feet of Live stem Developed | Dead Bushes | Per Cent Mortality |
|--------------------|------------------|-------------------------|------------------|-----------------------------|-------------|--------------------|
| A | 28 | 2,085 | 16 | 367 | 12 | 42.8 |
| B | 28 | 1,460 | 20 | 372 | 8 | 28.6 |
| C | 28 | 1,715 | 2 | 10 | 26 | 92.9 |
| D | 28 | 1,730 | 1 | 12 | 27 | 96.4 |

*Legend.

- A. Aerial portion cut off, crown exposed.
 B. Aerial portion cut off, crown covered by 4" of soil.
 C. Aerial portion and crown cut off, roots exposed.
 D. Aerial portion and crown cut off, roots covered by 4" of soil.

F. The Effect of Various Soil Disturbances on Ribes Germination on Different Exposures.

During the last two years seven fenced and screened plots have been established on various representative exposures. Most of these plots are composed of 36 milacres and are fenced with barbed wire to exclude stock. Each plot is divided into 3 equal parts. One part is fenced with fly screen to exclude rodents and covered with cheese-cloth to give a definite amount of shade; one part is fenced with fly screen to exclude rodents, and the third part is given no shade or protection from rodents. Various layers of duff were removed and the soil disturbed. (See page 223, 1929 annual report.) It is hoped by this method to determine in which part of the soil or duff ribes seeds are stored. From 8 to 16 fruits were planted and staked in each milacre plot to determine if the various disturbances were favorable to ribes germination.

As yet no data of significance have been obtained because the plots have not been established for a sufficient length of time.

G. Ribes Growth Studies on the Cow Creek Plot.

1. Purpose of study. The study was started in 1926 to find out the extent of Ribes invasion following logging and to study the Ribes bushes from year to year in relation to other plant life to determine the species of plant instrumental in shading out Ribes.

2. Methods used. An area of ten acres near Cow Creek which was cut in 1923 and fenced in 1927 has been under observation for the last three years. All of the bushes were located in 1928 and their ages determined. Each bush was staked with a 2-ft. stake to make rechecking easy. Ceanothus, bear clover, and other species of brush cover about three-fourths of the plot. During 1929 and 1930, the plot was rechecked, and each time a number of new bushes as well as many old ones which had been missed in the previous checks were located.

TABLE NO. 5

RIBES CONDITIONS ON THE COW CREEK PLOT

| Year of
Germination | Ribes Found each
Year | | |
|------------------------------|--------------------------|------|------|
| | 1928 | 1929 | 1930 |
| Present
Before
Logging | 20 | 26 | 25 |
| 1925 | 3 | 22 | 14 |
| 1926 | 17 | 40 | 23 |
| 1927 | 31 | 29 | 28 |
| 1928 | 0 | 15 | 31 |
| 1929 | - | 15 | 32 |
| 1930 | - | - | 32 |
| Totals | 62 | 146 | 185 |
| Ribes Per
Acre | 8.2 | 14.6 | 18.5 |

3. Results obtained. There are a few interesting things which the above table brings out. The old bushes seem to be holding their own with the brush species as only one has died within the last few years. During 1930, 32 new bushes appeared on the plot.

Data in the table do not represent a true germination and survival rate because some of the bushes are missed, probably die, and no record is ever made of them. However, this study is an indication of what takes place on an area which has been cut and on which Ribes have not been eradicated. The number of Ribes for 1930 shows an increase over the number for the previous year.

H. Moisture Studies on Dry Exposure.

1. Purpose of study. Generally Ribes are not as numerous on dry slopes as they are on the moist slopes. Neither do they appear to restock an area

3. Methods used. In order to obtain the most reliable information possible, the following methods were used:

2. ON 12/14/2

There is no doubt that the above information is true.

[illegible]

2. Results obtained. There was a low percentage of birds which were above table driving rate. The birds which were in the table driving rate were only one bird in the table driving rate.

increase over the number for the previous year. The number of Ripes for 1930 shows an

U. S. National Archives

1. Impress of study. Generally, after the first impression of the study, the student is left with a feeling of awe and wonder.

quite so readily when dry conditions prevail. This study was started to note the influence of moisture on the germination and survival of hibes on dry sites.

2. Methods used. A set of 12 fenced plots on a gentle south slope, each 2 milacres in size were established and the soil disturbed in various ways. Half of the plots were irrigated from a near-by spring, while the other half were not. Whole fruits were planted in all the plots and staked to facilitate relocation.

TABLE NO. 6

STUDY OF SEEDLING SURVIVAL UNDER DRY AND MOIST CONDITIONS

| Type Plots | Duff Removed -
Soil Cultivated | | Duff and Soil Cul-
tivated Together | | Soil and Duff
Undisturbed | |
|---------------|-----------------------------------|---------------------|--|---------------------|------------------------------|---------------------|
| | Number
Germinating | Number
Surviving | Number
Germinating | Number
Surviving | Number
Germinating | Number
Surviving |
| Irrigated | 31 | 20 | 68 | 45 | 30 | 3 |
| Non-irrigated | 63 | 13 | 56 | 3 | 25 | 9 |

3. Results obtained. The fruits which were planted on the irrigated and non-irrigated plots germinated about equally well. A greater number of seedlings survived on the irrigated plots than on the non-irrigated with the exception of the group where the soil was left undisturbed. The results of this study so far indicate that conditions for germination on the dry slopes are favorable in the spring. What seed is stored in the duff germinates in the spring but as the season advances the soil becomes dry and most of the seedlings die. This condition depletes the amount of seed stored in the soil and probably accounts for the sparse hibes population on south slopes.

**RESULTS OF THE GRABY
STUDIES**

A. Duff Analysis for Stored Seed.

During the latter part of the field season of 1940 samples of duff were taken from 26 different sites, which included as many variations as possible. A sample one meter square was laid off for each plot. The outline of the latter was made with a large sharp knife. The soil and duff were divided into three layers, namely; (1) the top or loose layer of needles and other debris; (2) the compacted humus layer; (3) the upper

at various intervals with a view to determining the rate of flow of water in the river and the amount of sediment carried by it. The results of these observations are being used to determine the rate of flow of water in the river and the amount of sediment carried by it.

[illegible]

1. 1948-1950

WILLIAMSON TELLS THE TWO WOMEN ABOUT THE REASON HE LEFT

| Soil and Soil | | Soil and Soil | | Soil and Soil | | Soil and Soil | |
|---------------|------|---------------|------|---------------|------|---------------|------|
| Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |

3. Results obtained. The results which were placed on the investigated

...of the field season of 1930 samples of ...
...from 25 different sites, which included as many variations
...of ...
...of the ...
...of the ...
...of the ...

two inches of mineral soil. Each layer was separately removed, screened, and the screenings placed in paper bags.

These samples were run through a small fan mill. Various kinds of seed were recovered in all three layers, but no attempt has been made as yet to identify them. As a control, known numbers of Ribes seeds were mixed with various samples of duff and soil, and it was possible to recover 100 per cent of the seed.

Fifty-four per cent of the samples taken from the top layer of the duff contained seed. The duff was collected late in the fall, so it is not surprising that seeds should be found in that layer. Sixty-seven per cent of samples taken from the second or the compact layer contained seeds. In the samples of the third layer or the upper two inches of mineral soil, seed was found in only 39 per cent of the samples. From one to fifty seeds were found in the samples with an average of about 10 per sample. Most of the seeds which were found in the layer of mineral soil were small, round and black. In fact, about 75 per cent by number of all the seeds were of this description. It is probably one of the *Gilias*.

B. Strip Transect Studies, Sierra National Forest.

1. Purpose of study. This study was undertaken on the Sierra National Forest to obtain, by a rapid and large-scale sampling, information on some of the following points: (1) what yearly changes in the Ribes population takes place on cut-over and cut-over and burned areas; (2) at what age do the Ribes begin to fruit heavily; (3) what is the Ribes population by timber type; (4) what is the average increase in live stems per year; (5) how soon after logging does Ribes establishment begin; (6) how long does it continue; and (7) any information concerning Ribes which seems pertinent to suppression methods.

2. Methods used. Strips were run with box compass and 2-chain topographic tape at 20-chain intervals through the cut-over areas. The strips or transects were 13.2 feet wide and often 3 to 5 miles in length, but for convenience the transects were divided into stations one chain long and 13.2 feet wide. All Ribes were checked by stations and recorded on standard forms. Maps of the logging areas showing the year each section was cut and information from logging scars assisted in determining the ages of various logged areas.

3. Description of Area. Most of the area which was logged prior to 1923 belonged to private operators. Hence, practically all of the timber was removed. The Forest Service owned a few narrow strips of timber around the edges which were only partially cut. These areas were included with the clear-cut areas in compiling the data. Practically all of the 1923 cuttings and a small part of the 1928 cuttings were made on Forest Service land.

Two boxes of mineral will be placed at mineral
and the contents placed in your bag.

These samples were run through a small EM MILL. Various kinds of feed were recovered in all three layers. But the highest two were not so identical. There was a distinct, better defined layer of seeds were mixed with various samples of soil and shells, and in the middle of the layer.

[illegible]

For more information, contact the nearest office of the FBI.

[illegible]

Section 101 and was information from logging source assisted in determining the cause of the fire.

[illegible]

Logging was begun on the area in 1923, but only a small amount of timber was cut. Starting in 1924 a large area was logged and then burned over. In 1925 another fire started during the logging season and burned over most of the 1923 and 1924 cut-overs and a small portion of the 1925 cut-over. Both of these fires were rather severe due to the logging debris which was scattered over the ground and to the dryness of the season. Although the boundaries of the two burns do not coincide, the 1925 overlapped the one of 1924. For this reason all of the 1923, 1924 and 1925 cut-over lands which were burned in 1924 and 1925 were classified as "1925 burn". It would have been impossible to have separated the burns due to the severity of both of them.

A great deal of the burned area was covered with a dense thicket of spring brush (Ceanothus cordulatus) which made working conditions difficult. Wherever a heavy burn occurs it is usually possible to find small patches of ground that have been burned lightly or not at all. These conditions are usually found in moist places where buff and debris are thin, where a fire has suddenly swept up a slope singeing the brush, and where for some reason or another the fire jumps and leaves a path unburned. All of the previous mentioned conditions were found on this 2,000-acre heavy burn.

The balance of the unburned area logged from 1923-1930 constitutes approximately 13,000 acres of contiguous cut-over land.

4. Results obtained from strip transect studies. The following tabulations summarize Ribes conditions on the Minarets cutting area of the Sierra National Forest. Data were taken in July, 1930.

The area was divided into sugar pine-fir and sugar pine-yellow pine eradication types. No separate records were kept for stream type. Most of the strips crossed the streams at right angles; hence, data taken in stream type were not sufficient to materially influence the data of the other types.

...on the river in 1934, but with a small amount
of water was left. In 1934 a large area was logged and then
burned over. In 1935 another large area was logged and then
burned over. Most of the 1935 and 1936 log-over areas were
of the 1935 log-over. Most of these fires were rather severe due to
the logging debris which was scattered over the ground and to the dryness
of the season. In 1936 the boundaries of the two burns do not coincide,
the 1935 overlapped the end of 1934. For this reason all of the 1935
1936 and 1937 log-over areas were burned in 1936 and 1937 were
classified as "1936 burn". It would have been impossible to have
separated the burns due to the similarity of the log-over areas.

A good deal of the burned area has recovered with a dense
growth of spruce, fir, and (ponderosa pine) which were common in the
original forest. However, a very few areas are still usually poorly
covered with small patches of ground that have been burned lightly or not
at all. These conditions are usually found in moist places where drift
and debris are still visible. The log-over areas are usually swept up a slope slinging
the debris, and where the debris is not blown or washed into the burn and
leaves a well wooded area. All of the log-over mentioned conditions were
found on this 1936-burn area.

The balance of the burned area logged from 1935-1936 consti-
tutes approximately 11,000 acres of coniferous cut-over land.

4. Boundary between logged and unlogged timber. The following table
shows the boundary between the logged and unlogged cutting area of the
Burned Forest. This was done in July, 1936.

The area was divided into three parts: (1) the area which was
logged in 1935, (2) the area which was logged in 1936, and (3) the area which
was not logged. The boundary between the logged and unlogged areas was
set off by a line of trees and brush. The boundary between the logged
area and the unlogged area was set off by a line of trees and brush. The
line of the other types.

...the area which was logged in 1935, (2) the area which was logged in 1936, and (3) the area which was not logged. The boundary between the logged and unlogged areas was set off by a line of trees and brush. The boundary between the logged area and the unlogged area was set off by a line of trees and brush. The line of the other types.

...the area which was logged in 1935, (2) the area which was logged in 1936, and (3) the area which was not logged. The boundary between the logged and unlogged areas was set off by a line of trees and brush. The boundary between the logged area and the unlogged area was set off by a line of trees and brush. The line of the other types.

...the area which was logged in 1935, (2) the area which was logged in 1936, and (3) the area which was not logged. The boundary between the logged and unlogged areas was set off by a line of trees and brush. The boundary between the logged area and the unlogged area was set off by a line of trees and brush. The line of the other types.

TABLE NO. 7

FIFTH DATA ON VARIOUS LAND CUITIVE AREAS, ALL IN 1923

| Year of Logging | Bushes Per acre All species and Ages | Feet Live Stem Per acre |
|-----------------|--------------------------------------|-------------------------|
| 1920 | 80 | 3,067 |
| 1929 | 80 | 301 |
| 1928 | 137 | 1,501 |
| 1927 | 253 | 3,131 |
| 1926 | 171 | 4,130 |
| 1925 | 230 | 3,287 |
| 1925 burn | 212 | 7,110 |

TABLE NO. 8

DISTRIBUTION OF WHITE BELLIES BY YEARS FOR VARIOUS LAND CUITIVE AREAS

| Year of Logging | 1920-1925 | | 1926-1928 | |
|-----------------|------------------------|-------------------------|------------------------|-------------------------|
| | Number Bushes Per acre | Feet Live Stem Per acre | Number Bushes Per acre | Feet Live Stem Per acre |
| 1920 | 18 | 212 | 57 | 3,743 |
| 1929 | 36 | 295 | 26 | 215 |
| 1928 | 34 | 377 | 58 | 410 |
| 1927 | 33 | 1,019 | 55 | 1,130 |
| 1926 | 80 | 1,375 | 68 | 1,494 |
| 1925 | 120 | 2,563 | 85 | 3,360 |
| 1925 burn | 103 | 3,341 | 73 | 2,636 |

The above data includes all A. rosea bushes found on the areas.

TABLE 1

WIRE DATA ON VARIOUS AGING COTTING MACHINES, ALL TYPES

| Year of
Invention | Number of
Machines
Produced | Year of
First Sale |
|----------------------|-----------------------------------|-----------------------|
| 1900 | 10 | 1900 |
| 1905 | 20 | 1905 |
| 1910 | 100 | 1910 |
| 1915 | 200 | 1915 |
| 1920 | 400 | 1920 |
| 1925 | 600 | 1925 |
| 1930 | 800 | 1930 |
| 1935 | 1000 | 1935 |

TABLE 2

PRODUCTION OF WIRE DATA IN THE UNITED STATES

| Year of
Invention | Year of
First Sale | Year of
First Sale | Year of
First Sale |
|----------------------|-----------------------|-----------------------|-----------------------|
| 1900 | 1900 | 1900 | 1900 |
| 1905 | 1905 | 1905 | 1905 |
| 1910 | 1910 | 1910 | 1910 |
| 1915 | 1915 | 1915 | 1915 |
| 1920 | 1920 | 1920 | 1920 |
| 1925 | 1925 | 1925 | 1925 |
| 1930 | 1930 | 1930 | 1930 |
| 1935 | 1935 | 1935 | 1935 |

The above data includes all the wire data produced in the United States.

TABLE NO. 9

PILES APPEARING ON VARIOUS AGED CUTTING AREAS SINCE CUTTING

| Year of Logging | SP-Fir Type | | | | SP-YF Type | | | |
|-----------------|-------------|-----------|--------------|-----------|------------|-----------|--------------|-----------|
| | R. roezli | | R. nevadense | | R. roezli | | R. nevadense | |
| | Number | Feet | Number | Feet | Number | Feet | Number | Feet |
| | Bushes | Live Stem | Bushes | Live Stem | Bushes | Live Stem | Bushes | Live Stem |
| | Per Acre | Per Acre | Per Acre | Per Acre | Per Acre | Per Acre | Per Acre | Per Acre |
| 1930 | 2 | 0.1 | 0 | 0 | 16 | 0.5 | 0 | 0.0 |
| 1929 | 28 | 2.6 | 10 | 7 | 16 | 1.6 | 0 | 0.0 |
| 1928 | 24 | 48.0 | 66 | 22 | 50 | 230.0 | 3 | 1.7 |
| 1927 | 78 | 424.0 | 50 | 175 | 75 | 475.0 | 26 | 130.0 |
| 1926 | 69 | 302.0 | 21 | 454 | 67 | 766.0 | 5 | 120.0 |
| 1925 | 105 | 1,420.0 | 39 | 650 | 68 | 1,410.0 | 10 | 276.0 |
| Burned | | | | | | | | |
| 1925 | 75 | 1,602.0 | 19 | 410 | 62 | 1,323.0 | 7 | 327.0 |

TABLE NO. 10

AID'S ESTABLISHMENT FOLLOWING LOGGING AND BURNING 1925 CUTTING AREA

| Year of Germination | SP-F Type | | | | SP-YF Type | | | |
|---------------------|-----------|----------------|----------------|----------------|------------|----------------|----------------|----------------|
| | Bushes | | Feet Live Stem | | Bushes | | Feet Live Stem | |
| | Per Acre | | Per Acre | | Per Acre | | Per Acre | |
| | Cut Only | Cut and Burned | Cut Only | Cut and Burned | Cut Only | Cut and Burned | Cut Only | Cut and Burned |
| 1930 | 28 | 26 | 3.5 | 2.6 | 26 | 18 | 2.6 | 1.6 |
| 1929 | 19 | 3 | 28.0 | 9.0 | 14 | 7 | 31.0 | 6.0 |
| 1928 | 24 | 8 | 155.0 | 78.0 | 15 | 8 | 152.0 | 38.0 |
| 1927 | 20 | 11 | 412.0 | 174.0 | 13 | 9 | 246.0 | 173.0 |
| 1926 | 11 | 18 | 472.0 | 712.0 | 10 | 12 | 431.0 | 455.0 |
| 1925 | 6 | 13 | 298.0 | 627.0 | 7 | 11 | 587.0 | 637.0 |
| Old bushes | 15 | 23 | 1,542.0 | 1,439.0 | 17 | 12 | 1,950.0 | 1,332.0 |
| Totals | 120 | 102 | 2,946.5 | 3,041.6 | 102 | 75 | 3,355.6 | 2,605.6 |

STATE WYOMING ON VARIOUS YEARS CUTTING AREA UNDER CULTURE

| Year of
Census | 1900-1909 | | | | 1910-1919 | | | |
|-------------------|---------------|----------------|----------------|----------------|---------------|----------------|----------------|----------------|
| | Total
Area | Under
Cult. | Under
Cult. | Under
Cult. | Total
Area | Under
Cult. | Under
Cult. | Under
Cult. |
| 1900 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1901 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1902 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1903 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1904 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1905 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1906 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1907 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1908 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1909 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1910 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1911 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1912 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1913 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1914 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1915 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1916 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1917 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1918 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1919 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |

TABLE NO. 10

STATE WYOMING ON VARIOUS YEARS CUTTING AREA UNDER CULTURE

| Year of
Census | 1900-1909 | | | | 1910-1919 | | | |
|-------------------|---------------|----------------|----------------|----------------|---------------|----------------|----------------|----------------|
| | Total
Area | Under
Cult. | Under
Cult. | Under
Cult. | Total
Area | Under
Cult. | Under
Cult. | Under
Cult. |
| 1900 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1901 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1902 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1903 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1904 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1905 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1906 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1907 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1908 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1909 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1910 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1911 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1912 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1913 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1914 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1915 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1916 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1917 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1918 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |
| 1919 | 1,000 | 100 | 100 | 100 | 1,000 | 100 | 100 | 100 |

TABLE NO. 11

RATE OF GROWTH OF KIPES ON CUT-OVER AND BURNED AREAS, 1925 CUTTING AND BURN

| Age of Bush | SP-Fir Type | | | | SP-Fir Type | | | |
|-------------|---------------------------------|---------|----------------|---------|---------------------------------|---------|----------------|---------|
| | Feet Live Stem Per Average Bush | | | | Feet Live Stem Per Average Bush | | | |
| | Cut Only | | Cut and Burned | | Cut Only | | Cut and Burned | |
| | R. roez. | R. nev. | R. roez. | R. nev. | R. roez. | R. nev. | R. roez. | R. nev. |
| 1 year | .1 | .1 | .1 | .1 | .1 | .1 | .1 | .1 |
| 2 years | 1.5 | 2.0 | 3.0 | 8.0 | 1.5 | 1.0 | 1.0 | 3.0 |
| 3 years | 8.0 | 8.0 | 10.0 | 12.0 | 8.0 | 8.0 | 5.0 | 12.0 |
| 4 years | 21.0 | 24.0 | 16.0 | 14.0 | 19.0 | 20.0 | 15.0 | 23.0 |
| 5 years | 43.0 | 37.0 | 33.0 | 29.0 | 43.0 | 27.0 | 25.0 | 33.0 |
| 6 years | 50.0 | 51.0 | 45.0 | 36.0 | 83.0 | 47.0 | 59.0 | 173.0 |
| 7+ years | 103.0 | 183.0 | 63.0 | 46.0 | 115.0 | 103.0 | 111.0 | 192.0 |

DISCUSSION AND CONCLUSIONS

of *Ceanothus* brush that grows into an area after a fire. The a

Table No. 7 represents a summary of a census of the kipes population of various age cuttings taken during July, 1930. The census includes all species of kipes occurring on both eradication types. This information is presented to show existing kipes conditions on the cut-over areas of the Sierra forest. On the 1925 burn kipes eradication would be exceedingly difficult because of the dense thickets of *Ceanothus cordulatus*.

Table No. 8 shows the total number of *R. roezli* bushes and feet of live stem per acre by types on the various aged cut-over areas. The large number of old bushes influences the results so that it is not possible to determine what has actually taken place.

Table No. 9 shows the number of new *R. roezli* and *R. nevadense* bushes and their corresponding feet of live stem per acre for the various aged cutting areas. The old bushes, or the ones present before logging, were not included in this table.

Table No. 10 compares kipes conditions on a 1925 burn and a 1925 cut-over area. More bushes were produced during 1927, 1928 and 1929 on the cut-over area than on the burned area. The dense growth of *Ceanothus* brush may be responsible in keeping down kipes on the burned area. In spite of the heavy burn many old bushes escaped the fire.

Table No. 11 shows the average size of kipes bushes of different ages on a 1925 cutting and burned area. Most of the 1930 bushes were found to have approximately 1/10th of a foot of live stem. Hence that figure was arbitrarily applied to all 1930 seedlings. It is possible to follow the bushes from 1925 to 1928 and see approximately how much the bushes increase in size from year to year. Both species of kipes apparently

grow at approximately the same rate. Growth rate is similar on cut-over areas and cut and burned areas, and in the two eradication types.

SUMMARY

A. The transect or temporary studies have provided the following information:

1. Some of the 3-year-old R. roezli bushes produce a few fruits but the 4-year-old bushes bear fairly heavy crops of fruits.

2. Ribes establishment begins immediately after logging but does not attain optimum development until the third, fourth and fifth years.

3. Ribes population increases on an area every year for six years or more.

4. On a heavy burn Ribes establishment apparently proceeds in a fairly natural manner for two or three years, after which time the increase is reduced. The reduction is probably due to the heavy concentration of Ceanothus brush that comes into an area after a fire. This conclusion is based on the comparison of a 1925 cut-over and a 1925 burn.

5. The average Ribes bush increases from approximately 1/10th of a foot to 83 feet of live stem over a period of six years.

6. Heavy brush thickets in which numerous Ribes occur are found on heavily burned areas.

7. Observations have shown that rodents transport large quantities of R. roezli seeds.

8. Birds consume R. nevadense fruits without damaging the viability of the seeds.

9. It is recommended that Ribes eradication be performed on logged areas the fourth year following logging. If eradication is postponed too long the bushes become larger and more difficult to remove. Heavy fruiting adds more seed to the soil, and the Ribes intermingle with the brush, making grubbing difficult.

from an approximately the same date. Growth rate is similar in the first
years and out and about three, but in the first year of life.

RESULTS

A. The amount of laboratory work has been provided the following information
from:

1. Data of the laboratory work has been provided the following information
the laboratory work has been provided the following information.

2. When establishment begins, the laboratory work has been provided the following information
the laboratory work has been provided the following information.

3. When establishment begins, the laboratory work has been provided the following information
the laboratory work has been provided the following information.

4. In a heavy duty laboratory work has been provided the following information
the laboratory work has been provided the following information.

5. The average time from the laboratory work has been provided the following information
the laboratory work has been provided the following information.

6. Heavy duty laboratory work has been provided the following information
the laboratory work has been provided the following information.

7. Observations have been made from the laboratory work has been provided the following information
the laboratory work has been provided the following information.

8. Data from the laboratory work has been provided the following information
the laboratory work has been provided the following information.

9. The laboratory work has been provided the following information
the laboratory work has been provided the following information.

10. The laboratory work has been provided the following information
the laboratory work has been provided the following information.

11. The laboratory work has been provided the following information
the laboratory work has been provided the following information.

12. The laboratory work has been provided the following information
the laboratory work has been provided the following information.

CALIFORNIA RE-ERADICATION STUDIES AND MISCELLANEOUS RESEARCHES

By

Lowell of Army. V. Benedict, Assistant Forester,

T. H. Harris, Junior Forester

Re-eradication studies were conducted on the 1934 and 1935 seasons.

RE-ERADICATION

A. Introduction

1. They are contiguous areas representing two seasons of eradication.

It is not possible on many sites to achieve at a reasonable cost permanent Ribes suppression by one eradication. There are several reasons for this:

1. At the time of eradication there are many Ribes plants too small to be readily located.

2. A preliminary survey of these areas shows that

2. Disturbances to the ground cover, such as logging and fire, favor Ribes seed germination and frequently result in a formidable crop of seedlings.

3. On moist sites, where Ribes are profuse, many viable fragments of root and crown are broken off during eradication work and later sprout.

Subsequent eradications are therefore necessary on certain sites to insure pine protection.

B. Purpose of Work

To study Ribes conditions and re-eradication costs on an area 3 and 4 years after the initial eradication for information on the following points:

1. The number of Ribes on the area and comparison with the original number.

2. Proportion of new bushes (seedlings) to sprouts and missed bushes, both as to number and amount of live stem.

3. The proportion of fruiting bushes 3 and 4 years after original eradication.

4. Rate of growth of seedlings.

5. The portion of the original eradication area needing reworking.

6. Proper time to perform re-eradication.

7. Checking of re-eradication.

RESEARCH REPORT ON THE EFFECTS OF RE-EXAMINATION

By
J. H. HARRIS, JR., Research Director
J. H. HARRIS, JR., Research Director

RE-EXAMINATION

A. Introduction

It is not possible to make a study of the effects of re-examination on the results of a test without first considering the reasons for this. The reasons for this are that the results of a test are not always the same, and the results of a test are not always the same. The results of a test are not always the same, and the results of a test are not always the same. The results of a test are not always the same, and the results of a test are not always the same.

It is the time of re-examination that many times gives the results to be readily located. The results of a test are not always the same, and the results of a test are not always the same. The results of a test are not always the same, and the results of a test are not always the same. The results of a test are not always the same, and the results of a test are not always the same.

Re-examination of the results of a test is necessary in order to be able to locate the results. The results of a test are not always the same, and the results of a test are not always the same. The results of a test are not always the same, and the results of a test are not always the same. The results of a test are not always the same, and the results of a test are not always the same.

B. Purpose of Test

The purpose of the test is to determine the results of a test. The results of a test are not always the same, and the results of a test are not always the same. The results of a test are not always the same, and the results of a test are not always the same. The results of a test are not always the same, and the results of a test are not always the same.

The results of a test are not always the same, and the results of a test are not always the same. The results of a test are not always the same, and the results of a test are not always the same. The results of a test are not always the same, and the results of a test are not always the same. The results of a test are not always the same, and the results of a test are not always the same.

The results of a test are not always the same, and the results of a test are not always the same. The results of a test are not always the same, and the results of a test are not always the same. The results of a test are not always the same, and the results of a test are not always the same. The results of a test are not always the same, and the results of a test are not always the same.

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C. Checking of re-examination

8. Cost of second eradication and comparison with original cost.

C. Location of Area

Re-eradication studies were conducted on the 1926 and 1927 experimental Ribes eradication areas in township 4 north, range 18 east, Stanislaus National Forest. These areas were selected because:

1. They are contiguous areas representing two seasons of eradication work.

2. Different aged timber sales were represented. Some cutting was done just before eradication work and some shortly after. There were also old cutting areas represented.

3. A preliminary examination of these areas showed numerous Ribes seedlings, some of which were fruiting, of sufficient size and quantity to warrant re-eradication studies.

D. Methods of Work

The 1926 and 1927 eradication areas were considered as separate units. Original block boundaries were re-established wherever possible and the block completely reworked. In some cases only a portion of a block was reworked due to lack of time. On three blocks no re-eradication work was done. (See map accompanying this report.)

Three-man crews were used exclusively. The 3-man crew had proved most successful on previous eradication operations. A fourth man (recorder) was attached to each crew to analyze and record on special forms all Ribes data. This man did no eradication work and his time was not charged against re-eradication costs. All men were experienced eradication men.

On areas where Ribes were few and scattered the men spread out and functioned as a scout crew. Where Ribes were numerous an intensive formation was employed.

From 2 to 5 per cent of the area of each block was systematically checked for missed bushes by running check strips on a compass course at periodic intervals across blocks. Blocks suspected of containing few Ribes were checked in advance of crew work and when found free of Ribes were eliminated from further consideration.

E. Results of Work

1. The gross results of the season's work show 3,825 acres (87%)

1. Part of second expedition and comparison with original work.

Location of Area

Re-surveyed areas were situated on the 1900 and 1901 maps of the California National Forest. These areas were selected because:

1. They are contiguous areas representing the same of vegetation.

2. They are contiguous areas representing the same of vegetation.

3. A preliminary examination of these areas showed numerous differences, some of which were further of evidence also and possibly a general re-examination.

Methods of Work

The 1900 and 1901 expedition areas were considered as separate units. Original black boundaries were re-established wherever possible. The black boundary treatment. In some cases with a portion of a block was removed and in some of them. On some blocks no re-examination was made. (See map accompanying this report.)

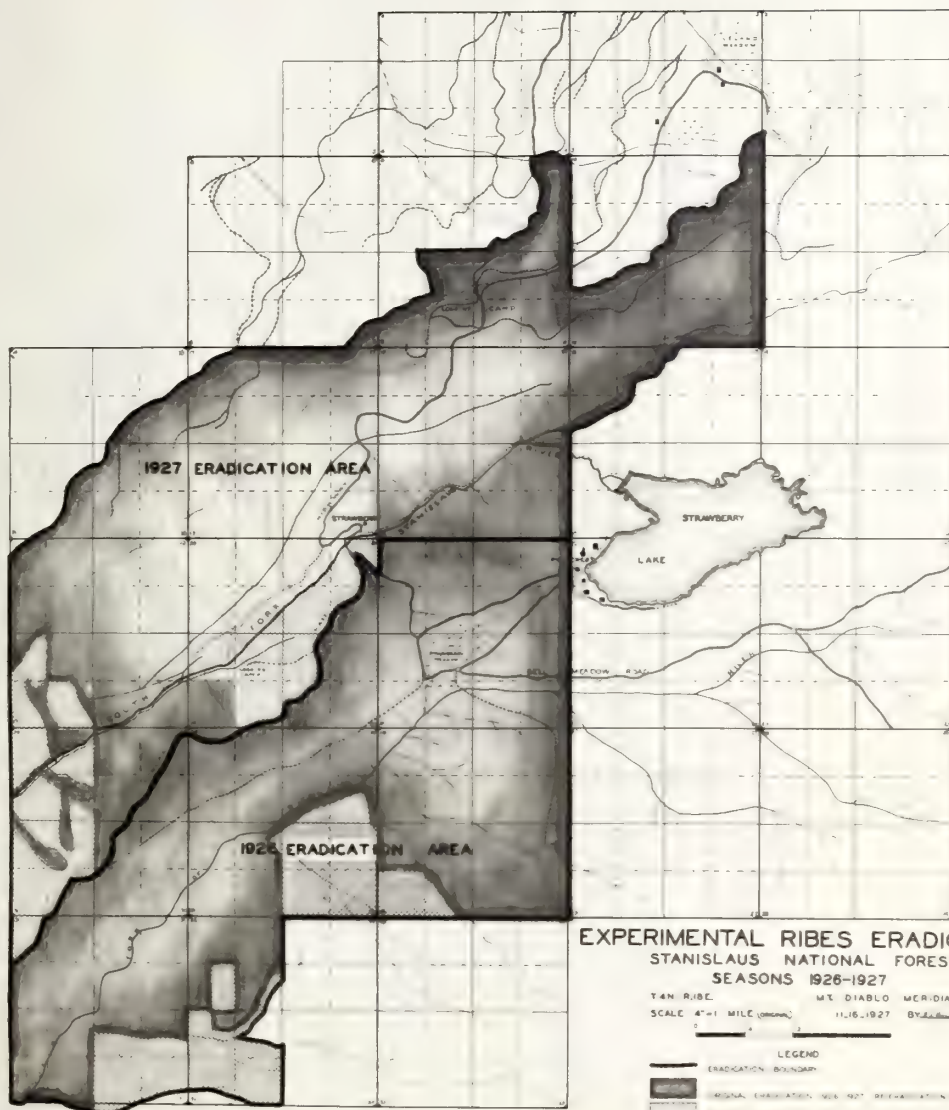
Thorough work was made individually. The 1900 area was re-surveyed as previously mentioned. A further examination was made of each area to see if any of the original boundaries were still in place. This was the case with the 1900 area. The 1901 area was re-examination made. The 1901 area was re-examination made.

On some areas there was no re-examination. The 1900 area was re-examination made. The 1901 area was re-examination made.

From 1 to 2 per cent of the area of each block was re-examination made. The 1900 area was re-examination made. The 1901 area was re-examination made.

Results of Work

1. The first results of the second's work were as follows:



Annual Report 1930
W. V. Benedict



covered by the re-eradication crews out of the 6,670 acres comprising the two experimental areas. The accompanying map shows by cross-hatching the portions not worked. 180,909 bushes having 1,004,767 feet of live stem were pulled. This is an average of 31 bushes and 173 feet of live stem per acre.

Table 1 is a summary by areas and by types of work done.

covered by the re-plantation grove out of the 6,000 acres comprising
the two experimental areas. The accompanying map shows by cross-hatching
the portions not planted. 10,000 bushes having 1,000,000 feet of live
stem were killed. This is an average of 20 bushes and 175 feet of live
stem per acre.

Table 1 is a summary of areas and by types of soil.

TABLE NO. 1

SUMMARY OF RE-ERADICATION, BUSHES PULLED, STANISLAUS NATIONAL FOREST, CALIFORNIA,

1930

| Erad.
Unit | Eradication
Type | Acres | Man-Days | | Seedlings | | | Sprouts | | | Missed | | | Totals | | |
|---------------|---------------------|-------|----------|----------|-----------|--------------|------|---------|--------------|------|--------|--------------|------|---------|--------------|------|
| | | | Crew | Recorder | Bushes | Feet
Live | Stem | Bushes | Feet
Live | Stem | Bushes | Feet
Live | Stem | Bushes | Feet
Live | Stem |
| 1927 | SP-IF CO | 2,034 | 75-7/8 | 25-5/8 | 10,706 | 156,619 | | 893 | 18,498 | | 641 | 48,565 | | 12,240 | 223,782 | |
| | SP-F CO | 1,016 | 210-7/8 | 67-7/8 | 37,652 | 239,584 | | 3,270 | 35,566 | | 2,363 | 85,378 | | 43,296 | 364,528 | |
| | STANCO | 150 | 52 | 20 | 33,362 | 56,509 | | 594 | 5,364 | | 214 | 6,980 | | 34,130 | 68,532 | |
| Total | | 3,200 | 346-3/4 | 113-1/2 | 81,730 | 452,412 | | 4,717 | 63,428 | | 3,218 | 141,003 | | 89,666 | 656,843 | |
| 1928 | SP-IF CO | 751 | 61-7/8 | 26-5/8 | 5,498 | 23,756 | | 1,401 | 28,351 | | 468 | 25,902 | | 7,367 | 77,999 | |
| | SP-IF Mat. | 340 | 1-3/4 | - | 177 | 1,019 | | 74 | 512 | | 69 | 2,651 | | 320 | 4,162 | |
| | SP-F CO | 1,071 | 163-3/8 | 62-7/8 | 38,541 | 85,462 | | 4,088 | 35,575 | | 958 | 23,896 | | 43,627 | 148,533 | |
| | SP-F Mat. | 137 | 43-1/2 | 13-3/4 | 849 | 1,489 | | 866 | 5,915 | | 2,410 | 32,653 | | 4,174 | 40,009 | |
| 1929 | STANCO | 326 | 64-3/8 | 26-7/8 | 22,735 | 34,146 | | 2,435 | 24,372 | | 586 | 17,663 | | 35,756 | 75,781 | |
| | Totals | 2,625 | 374-7/8 | 121-1/8 | 77,843 | 145,872 | | 8,864 | 99,305 | | 4,531 | 102,717 | | 91,244 | 347,924 | |
| 1926 and | | | | | | | | | | | | | | | | |
| 1927 Totals | | 5,825 | 721-5/8 | 234-5/8 | 159,579 | 598,284 | | 13,581 | 162,733 | | 7,749 | 243,780 | | 180,909 | 1,004,767 | |

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Table 2 shows the time of work spent on the different types of work. The data are presented in the form of a table, and the results are discussed in the text.

TABLE NO. 2

KIBES PER ACRE, RE-PROPAGATION, SEMISLAUS NATIONAL FOREST, CALIFORNIA, 1930

| Prod.
Unit | Propagation
Type | Acres | Non-Days
Per Acre | | Kibes Per Acre | | | | | Totals | |
|---------------------|-----------------------------|-------|----------------------|------|---------------------|--------|-------------------|--------|------------------|--------|--------|
| | | | Grew | Rec. | Seedlings
Bushes | F.I.S. | Sprouts
Bushes | F.I.S. | Missed
Bushes | F.I.S. | Bushes |
| 1927 | St-IP CO | 2,034 | .036 | .013 | 5.3 | 77 | .4 | 9 | .3 | 24 | 5.0 |
| | St-IP CO | 1,016 | .208 | .067 | 37.1 | 236 | 3.2 | 39 | 2.3 | 34 | 42.6 |
| | Stream CO | 150 | .413 | .133 | 222.4 | 375 | 3.7 | 36 | 1.4 | 46 | 227.5 |
| Averages | | 3,200 | .108 | .033 | 29.9 | 141 | 1.0 | 20 | 1.0 | 44 | 28.0 |
| 1926 | St-IP CO | 751 | .109 | .035 | 7.3 | 32 | 1.9 | 36 | .6 | 34 | 9.8 |
| | St-IP Mature | 340 | .005 | - | .5 | 3 | .2 | 1 | .2 | 8 | .9 |
| | St-IP CO | 1,071 | .133 | .049 | 35.0 | 80 | 3.6 | 37 | .9 | 22 | 40.7 |
| | St-IP Mature | 137 | .218 | .093 | 6.6 | 11 | 5.3 | 43 | 17.6 | 238 | 30.6 |
| | Stream | 325 | .259 | .089 | 100.4 | 105 | 7.5 | 77 | 1.3 | 54 | 109.7 |
| Averages | | 2,626 | .145 | .046 | 29.7 | 56 | 3.4 | 28 | 1.7 | 39 | 24.6 |
| 1926
and
1927 | Totals or
Grand Averages | 6,826 | .124 | .040 | 27.4 | 103 | 2.3 | 28 | 1.3 | 42 | 31.0 |
| | | | | | | | | | | | 173 |

On the 1927 area there was originally an average of 50 bushes per acre as against 28 found by re-eradication. On the 1926 area there was originally an average of 35 bushes per acre whereas re-eradication showed 35. The apparent explanation is the difference in the time of eradication on the two areas. Four years had elapsed before re-eradication on the 1926 unit, and only three years for the 1927. The additional year allowed seven more bushes per acre to become established. Other factors have probably influenced this result, since these areas have been considerably altered by logging operations prior to and since the first eradication work, and not to the same degree upon each. It is difficult to measure the effect of these disturbances with a view to accurately comparing eradication types because of time variations in their incidence. The types themselves have changed; most of the mature types have been cut over.

SIZE OF AVERAGE BUSH

A comparison by blocks of *Ribes* per acre of the original eradication with re-eradication is given by the frequency curve charts 2 and 3. The most significant fact brought out by these charts is the reduction in *Ribes* per acre from an average of 59.5 for both areas, found by the original eradication, to 31 per acre. The 1930 (re-eradication) curve for the 1927 area falls below the 1927 curve in all but four cases, where the actual number of *Ribes* found the second time was greater than that found the first. Similar curves for the 1926 area show the variations found there. Disturbances due to logging following the initial eradication probably account for these increases in bushes per acre for certain blocks as shown by the crossing of the curves. Changes brought about by logging, such as exposure of mineral soil, increased sunlight to ground cover, and alterations in available soil moisture favor *Ribes* germination and growth. In every case where an increase occurred, logging took place at the time of or subsequent to eradication.

In 1927 *R. roezli* composed 78 per cent of the total bushes and in 1930 the percentage had fallen to 63. The remaining percentage is *R. nevadense* and a few individual bushes of *R. cereum* and *R. hallii*, which were all placed together for convenience. In 1926 *R. roezli* constituted 50 per cent of the bushes and in 1930 it formed 70 per cent. Chart 1, figure 1, shows the average for both years. Table 3 shows the percentages of *Ribes* species by types. The probable explanation of the decrease in percentage of *R. roezli* is because of the exceedingly prolific seedling production made by *R. nevadense* in stream type.

10 20 30 40 50 60 70

CHART 1
RIBES SPECIES IN PERCENTAGE OF TOTAL

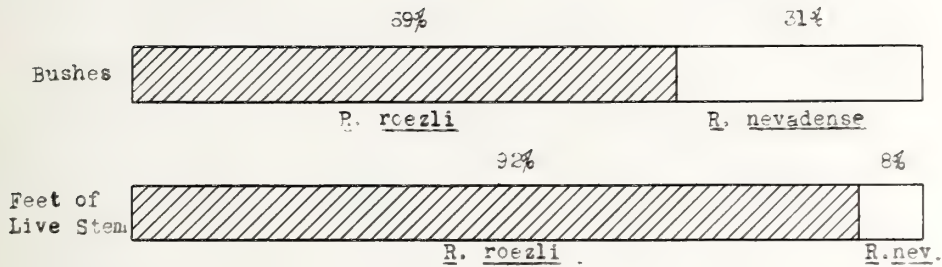


Figure 1

SIZE OF AVERAGE BUSH

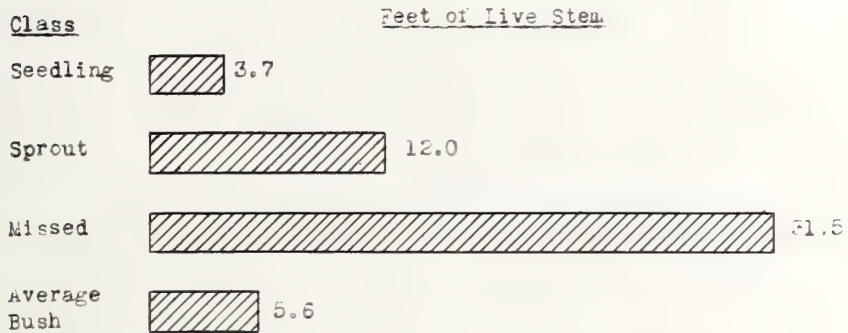


Figure 2

RELATION OF BUSHES TO FEET OF LIVE STEM
BY CLASSES IN PERCENTAGE OF TOTAL

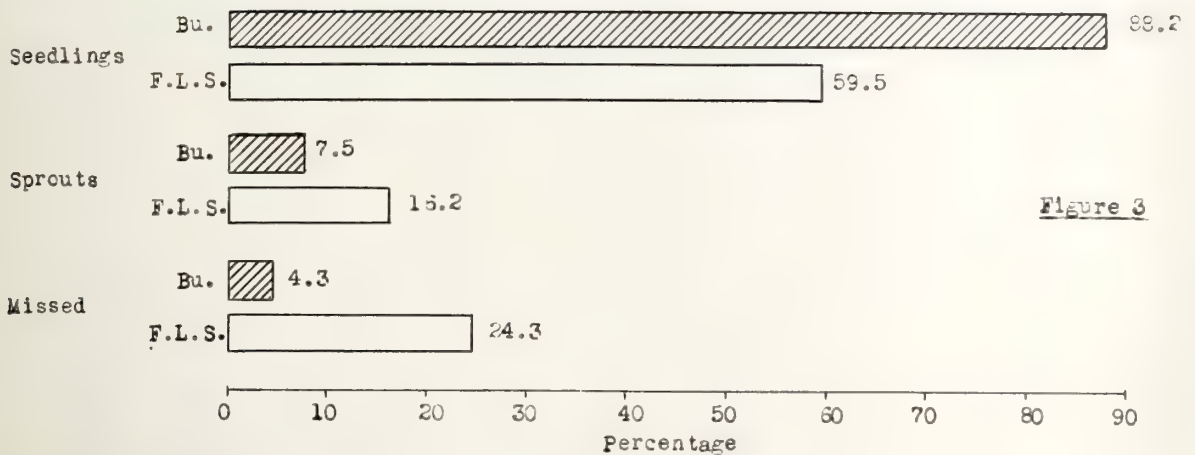


Figure 3



CHART 2

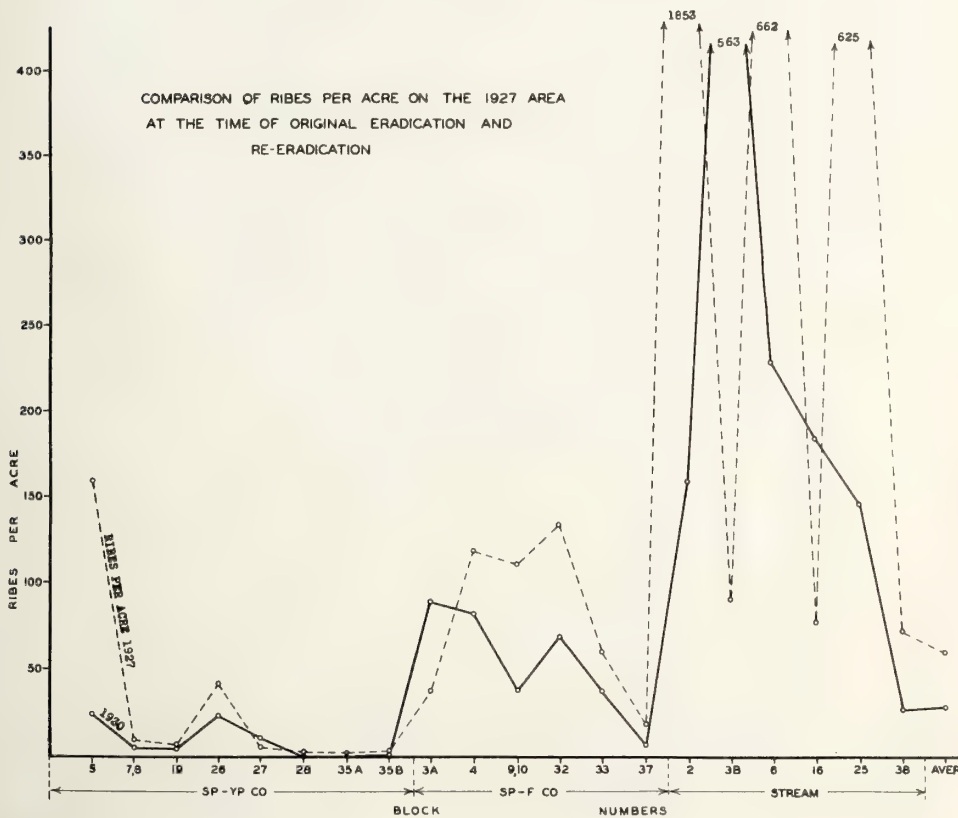
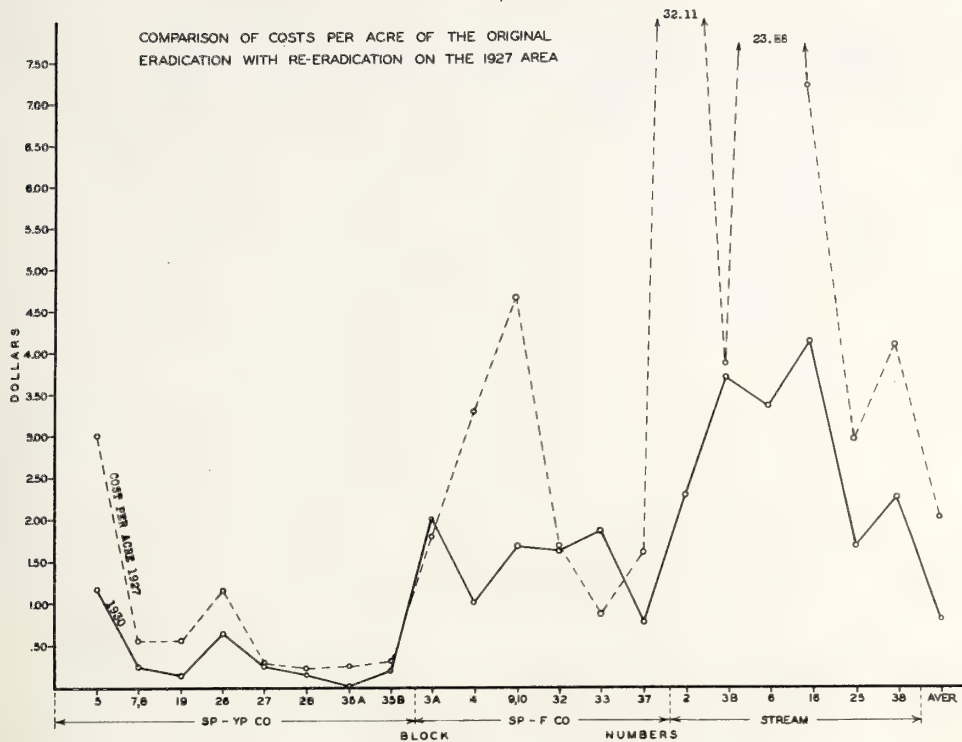
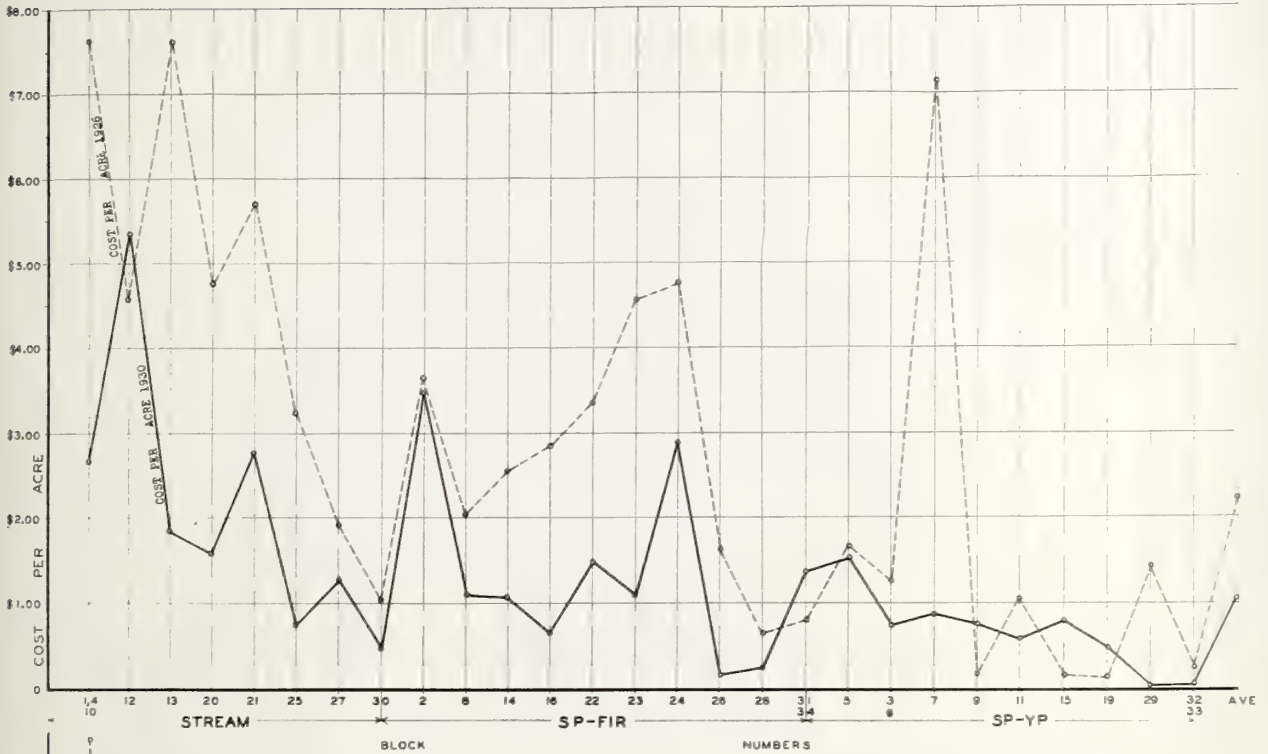




CHART 3

COMPARISON OF COSTS PER ACRE OF ORIGINAL
ERADICATION WITH RE-ERADICATION—1926 AREA



COMPARISON OF RIBES PER ACRE OF ORIGINAL
ERADICATION WITH RE-ERADICATION—1926 AREA

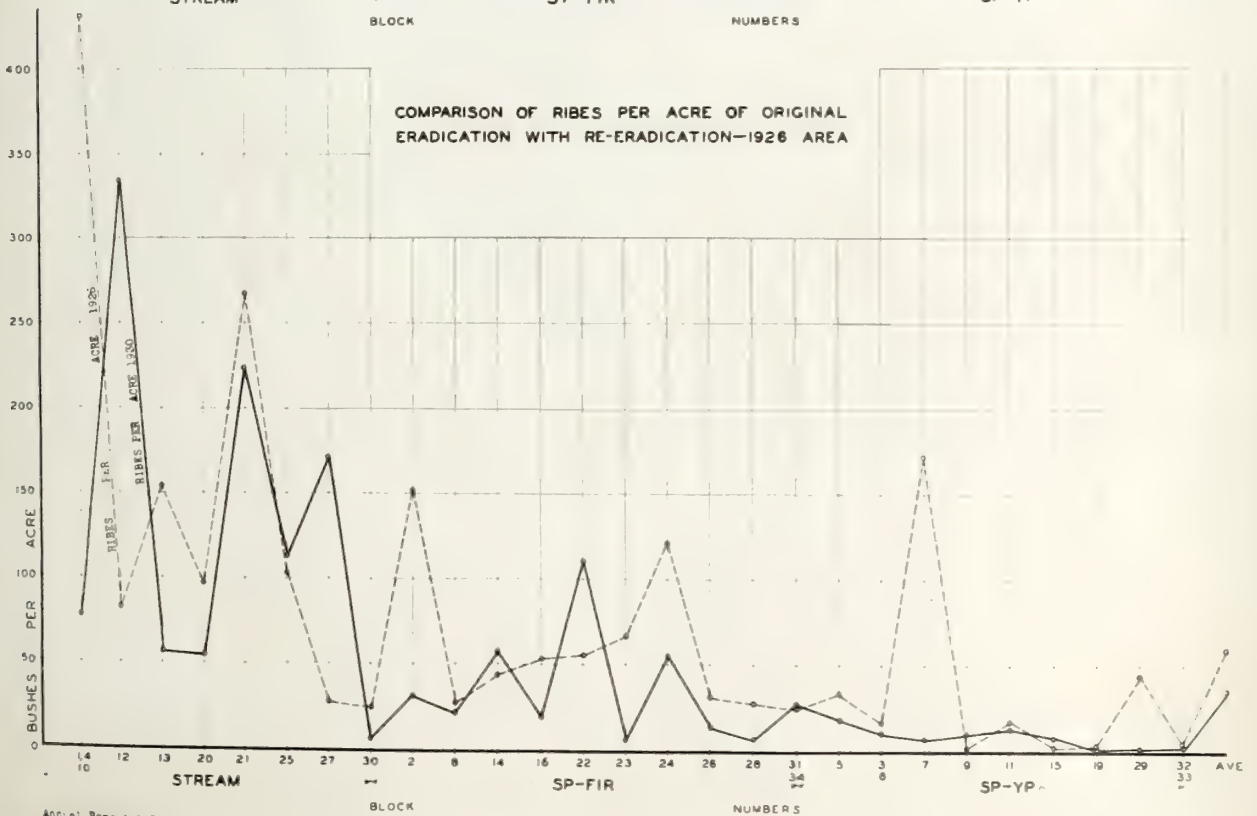


TABLE NO. 3

PERCENTAGES OF RIMS BY SPECIES

| Erad.
Unit | Eradication
Type | Percentages by Species | | | |
|---------------------|---------------------|------------------------|-------------|--------------|-------------|
| | | R. roezli | | R. nevadense | |
| | | %
Bushes | %
F.L.S. | %
Bushes | %
F.L.S. |
| 1927 | SI-VI CO | 85 | 98 | 15 | 2 |
| | SI-VI CO | 88 | 97 | 12 | 3 |
| | Stream CO | 24 | 41 | 76 | 59 |
| | Average | 83 | 91 | 37 | 9 |
| 1926 | SI-VI CO | 95 | 99 | 5 | 1 |
| | SI-VI Mature | 98 | 99.8 | 2 | 0.2 |
| | SI-VI CO | 83 | 94 | 17 | 6 |
| | SI-VI Mature | 92 | 95 | 8 | 5 |
| | Stream CO | 58 | 75 | 42 | 21 |
| Average | | 75 | 92 | 25 | 8 |
| 1927
and
1926 | Averages | 69 | 92 | 31 | 8 |

2. Table 4 shows that 52 per cent of all bushes are seedlings, that is, had their origin since the first eradication, 8 per cent are sprouts, and 4 per cent are missed bushes. The seedlings, however, have 60 per cent of the live stem, sprouts have 16 per cent, and missed bushes 24 per cent. This is shown graphically by chart 1, figure 3. Frequently in the field it was difficult for the crewmen to accurately classify the bushes. The characters distinguishing a sprout were many times obscure and even lacking, and small suppressed missed bushes could very easily be mistaken for seedlings. Because of this it is thought that the seedling class has more than its full share of bushes at the expense, particularly of the missed group.

It is likely that some of the seedlings are actually sprouts, and some may offer suggestions as to cause.

TABLE NO. 2

PERCENTAGES OF MINS BY SECT...

| Year | Unit | Production
Tons | Consumption
Tons | | Imports
Tons | Exports
Tons |
|------|------|--------------------|---------------------|-----------------|-----------------|-----------------|
| | | | Domestic
Tons | Foreign
Tons | | |
| 1957 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1958 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1959 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1960 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1961 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1962 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1963 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1964 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1965 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1966 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1967 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1968 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1969 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1970 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1971 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1972 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1973 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1974 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1975 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1976 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1977 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1978 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1979 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1980 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1981 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1982 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1983 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1984 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1985 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1986 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1987 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1988 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1989 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1990 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1991 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1992 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1993 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1994 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1995 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1996 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1997 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1998 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 1999 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2001 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2002 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2003 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2004 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2005 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2006 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2007 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2008 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2009 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2010 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2011 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2012 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2013 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2014 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2015 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2016 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2017 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2018 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2019 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2020 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2021 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2022 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2023 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2024 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2025 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2026 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2027 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2028 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2029 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2030 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2031 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2032 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2033 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2034 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2035 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2036 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2037 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2038 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2039 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2040 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2041 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2042 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2043 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2044 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2045 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2046 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2047 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2048 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2049 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2050 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2051 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2052 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2053 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2054 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2055 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2056 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2057 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2058 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2059 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2060 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2061 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2062 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2063 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2064 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2065 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2066 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2067 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2068 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2069 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2070 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2071 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2072 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2073 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2074 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2075 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2076 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2077 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2078 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2079 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2080 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2081 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2082 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2083 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2084 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2085 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2086 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2087 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2088 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2089 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2090 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2091 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2092 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2093 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2094 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2095 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2096 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2097 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2098 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2099 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 2100 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |

of the mixed group.

TABLE NO. 4

PERCENTAGES OF RIBES CLASSES BY TYPE

| Grad. Unit | Eradication Type | Percentages of Ribes by Species | | | | | |
|---------------|------------------|---------------------------------|----------|----------|----------|----------|----------|
| | | Seedlings | | Sprouts | | Missed | |
| | | % Bushes | % F.L.S. | % Bushes | % F.L.S. | % Bushes | % F.L.S. |
| 1927 | SP-YF CO | 88 | 70 | 7 | 8 | 8 | 22 |
| | SP-F CO | 87 | 66 | 8 | 11 | 6 | 23 |
| | Stream CO | 97.8 | 82 | 1.6 | 8 | 0.6 | 10 |
| | Average | 91 | 69 | 5 | 10 | 4 | 21 |
| 1926 | SP-YF CO | 75 | 31 | 19 | 36 | 6 | 33 |
| | SP-YF Mature | 55 | 28 | 23 | 12 | 22 | 63 |
| | SP-F CO | 88 | 57 | 10 | 27 | 2 | 16 |
| | SP-F Mature | 21 | 4 | 21 | 15 | 58 | 91 |
| | Stream CO | 92 | 44 | 7 | 33 | 1 | 23 |
| Average | | 85 | 42 | 10 | 28 | 5 | 30 |
| 1927 and 1926 | Averages | 88 | 60 | 8 | 16 | 4 | 24 |

The question of the size of the average bush is naturally raised by these considerations. The average seedling has 8.7 feet of live stem, the average sprout 12.0 feet, and the average missed bush 31.5 feet. (See chart 1, figure 2.)

3. In order to ascertain the percentages of seedlings, sprouts and missed bushes bearing fruit, data on this point were taken when the bushes were pulled. Table 5 shows by type the percentage of Ribes of each class producing fruit. Three per cent of the seedlings on the 1927 area and 0.4 per cent of those on the 1926 area were fruiting. This disparity in the two areas is also shown in the sprouts and missed bush classes and is difficult to explain. Differences between the areas in density of ground cover, time and intensity of logging, and perhaps slope may offer suggestions as to causes.

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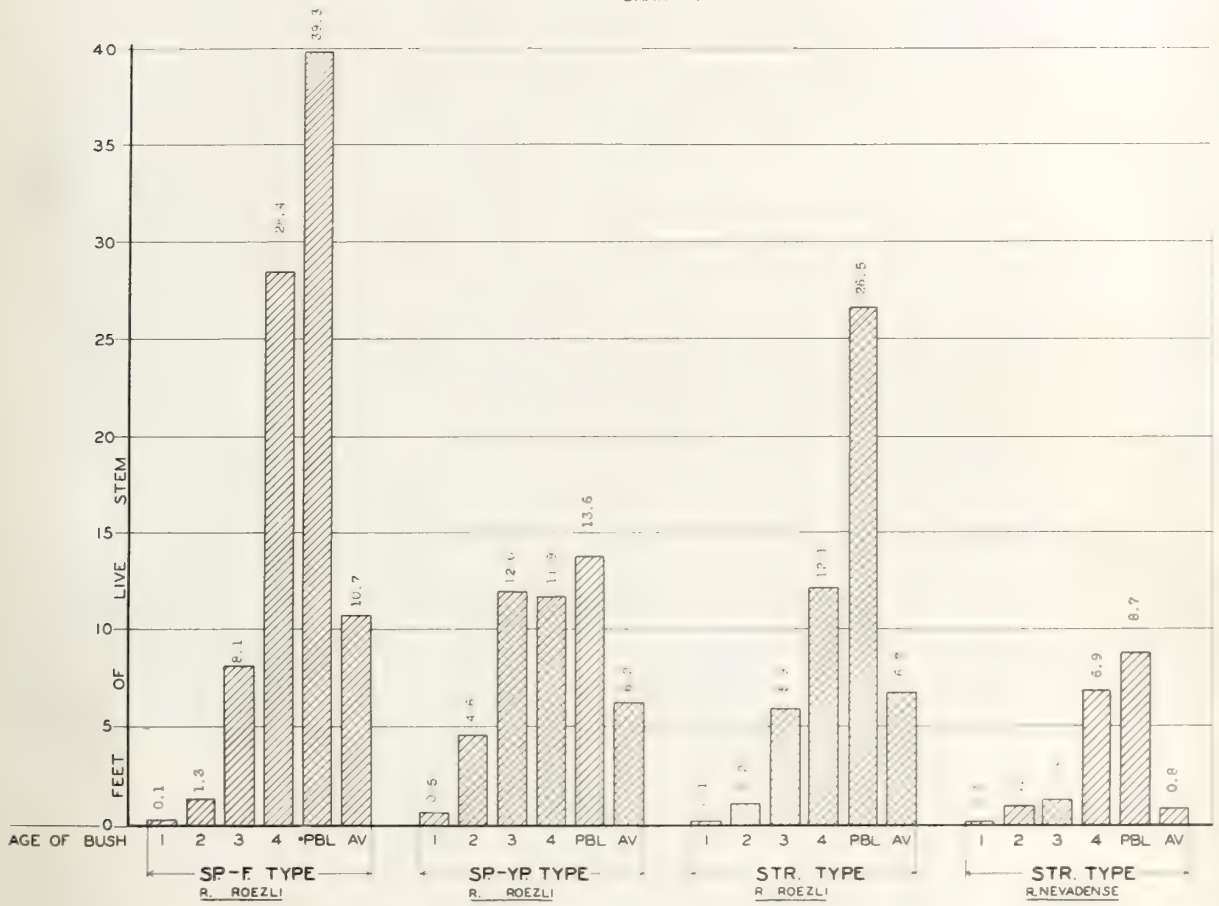
TABLE NO. 3

PERCENTAGES OF RIBES FRUITING

| Erad. Unit | Eradication Type | Percentages of Bushes Fruiting | | |
|---------------------------|------------------|--------------------------------|-----------|----------|
| | | % Seedlings | % Sprouts | % Missed |
| 1927 | SP-YF CO | 8.0 | 26.4 | 50.4 |
| | SP-F CO | 4.1 | 20.0 | 29.7 |
| | Stream CO | 0.3 | 14.6 | 31.3 |
| | Average | 3.0 | 21.0 | 33.9 |
| 1926 | SP-YF CO | 1.3 | 24.3 | 41.5 |
| | SP-YF Mature | 0.0 | 6.8 | 40.6 |
| | SP-F CO | 0.6 | 13.0 | 22.4 |
| | SP-F Mature | 0.0 | 4.6 | 7.8 |
| | Stream CO | 0.09 | 13.8 | 28.2 |
| Average | | 0.4 | 14.1 | 17.7 |
| Average for 1927 and 1926 | | 1.8 | 16.5 | 24.4 |

4. Information was desired as to the rate of growth of *R. razzli* and *R. nevadense* during the early years of their existence. Accordingly the amount of live stem was measured and the age determined for each bush on sample areas of the three cut-over eradication types. Bushes ranged from those of the current season to an age of four years, beyond which exact ages could not be accurately determined. Bushes older than four years were designated as "present before logging" since four years antedated all logging operations on areas studied. These figures are averaged and presented in diagram form in chart 4. The numbers of bushes upon which the study is based are given in table 6. Insufficient data make a weak point at the fourth season in sugar pine-yellow pine type and to some extent in the third season; likewise *R. nevadense* in stream type is weak at the fourth season and at "present before logging". The height of the fourth season bar for sugar pine-yellow pine type probably falls in the vicinity of 20 feet of live stem, which is a more regular gradation.

CHART 4



RATE OF GROWTH OF RIBES ON CUT-OVER AREAS

* Present before 1930

Annual Report 1930

W. V. Benedict



TABLE NO. 6

DATA USED AS BASIS FOR CHART 4

| Type | Year Logged | Acres | Number of Bushes | | | | | Total Bushes |
|--------------------------------------|-------------|-------|------------------|-------|-----|-----|--------|--------------|
| | | | 1* | 2 | 3 | 4 | P.B.L. | |
| SP-YF CO
(<i>R. roezli</i>) | 1927 | 54 | 741 | 714 | 88 | 32 | 631 | 2,184 |
| SP-F CO
(<i>R. roezli</i>) | 1927 | 22 | 122 | 415 | 306 | 88 | 164 | 1,150 |
| Stream CO
(<i>R. roezli</i>) | 1927 | 4 | 420 | 457 | 386 | 134 | 280 | 1,647 |
| Stream CO
(<i>R. nevadense</i>) | 1927 | 4 | 1,471 | 1,536 | 718 | 68 | 45 | 4,238 |

*Age of bushes in seasons of growth. 1 is the current or 1928 season, 2 represents bushes originating in 1929, etc.

**Present before logging.

Although *R. roezli* is a drought resistant species occurring on the hot southerly exposures of the sugar pine-yellow pine types, it attains its greatest size and greatest rate of growth on the cooler sugar pine-fir slopes. It is not primarily a stream type species and hence it should not be expected to attain optimum growth there, where moisture evidently does not compensate for reduced sunlight and the more competitive conditions of a denser ground cover.

Data depicting rate of growth of *R. nevadense*, especially for the older bushes, are probably insufficient to fully evaluate the rate of growth the species is capable of making in stream type.

5. All of the original eradication blocks were not reworked by the usual crew method. It was found that parts of the sugar pine-yellow pine cut-over and mature types contained few or practically no bushes, hence it was not necessary to send crews into them. Into blocks on which a paucity of bushes was suspected a checker was sent to determine their number and occurrence. He was followed by one or two men who cleaned out the patches, if only a few were reported. Thus considerable crew time was saved. Much of the sugar pine-yellow pine type was covered by a regular crew in scout formation, that is, with wide intervals between men.

6. This first re-eradication does not provide complete information as to the proper time to perform re-eradication. Re-eradications must be correlated with the age at which seedlings fruit and the time after

TABLE NO. 6

DATA USED AS BASIS FOR CHART 4

| Type | Year | Total Area | Number of Bushes | | | | | Total Number |
|-----------------|------|------------|------------------|-------|-----|-----|-----|--------------|
| | | | 1 | 2 | 3 | 4 | 5 | |
| (R. rosea) 1927 | 1927 | 54 | 741 | 714 | 66 | 38 | 631 | 2,194 |
| (R. rosea) 1927 | 1927 | 32 | 122 | 412 | 266 | 32 | 124 | 1,100 |
| (R. rosea) 1927 | 1927 | 4 | 420 | 427 | 368 | 134 | 120 | 1,397 |
| (R. rosea) 1927 | 1927 | 4 | 1,471 | 1,288 | 718 | 68 | 45 | 4,286 |

* Age of bushes in seasons of growth. 1 is the current or 1927 season, 2 represents bushes originating in 1925, etc.

**Present before logging.

Although *R. rosea* is a shrubby perennial species occurring on the hot southern exposure of the sugar pine-yellow pine type, it attains its greatest size and greatest rate of growth on the cooler sugar pine-life stages. It is not primarily a stress type species and hence it should not be expected to attain optimum growth there, where moisture evidently does not compensate for reduced sunlight and the more competitive conditions of a denser ground cover.

Data depicting rate of growth of *R. nevadense*, especially for the older bushes, are probably insufficient to fully evaluate the rate of growth the species is capable of making in stress type.

3. All of the original seedling bushes were not covered by the usual cover material. It was found that parts of the sugar pine-yellow pine cut-over and mature types contained few or practically no bushes, hence it was not necessary to seed these into them. Into blocks on which a quantity of bushes was associated a checkered tag was used to determine their number and occurrence. As was followed by one or two men who cleaned out the patches, if only a few were reported. These considerable areas were saved. Much of the sugar pine-yellow pine type was covered by a regular cover in some formation, that is, with side intervals between men.

4. This first re-establishment does not provide complete information as to the proper time to perform re-establishment. Re-establishment must be correlated with the age at which seedlings first and the time after

eradication when germination of seed that may be stored in the duff ceases. On this latter point complete information is lacking which subsequent studies will supply. Fruiting 3-year-old bushes, as well as numerous 1930 seedlings found on parts of the eradication area are evidence that these factors were operating. Seed was being produced by the new plants before all stored seed had germinated. The abundance of 1930 seedlings could not well be accounted for by the small number of fruiting sprouts or missed bushes found on the eradication areas, nor could the fruiting seedling group be responsible since but a small number were fruiting and they for the first time. A third eradication will therefore be needed on certain sites on these areas before permanent ribes suppression will be secured.

7. The efficiency of re-eradication, as found by systematically checking from 2 to 5 per cent of the area of each type, is shown in table 7.

TABLE NO. 7

CHECKING DATA

BUSHES AND LIVE STEW LEFT PER ACRE

| Eradication Type | 1927 Area | | 1926 Area | |
|------------------|----------------|-----------------|----------------|-----------------|
| | Ribes per Acre | F.L.S. per Acre | Ribes per Acre | F.L.S. per Acre |
| SI-Y C3 | 2.6 | 21 | 1.8 | 14.0 |
| SI-Y Mat. | - | - | .03 | .07 |
| SI-F C3 | 7.0 | 19 | 7.0 | 23.0 |
| SI-F Mat. | - | - | 10.0 | 35.0 |
| Stream | 51.0 | 44 | 23.0 | 20.0 |
| Average | 6.0 | 21 | 7.0 | 20.0 |

8. Cost of re-eradication. The cost of re-eradication by type is shown in table 8. Charts 2 and 3 delineate the costs per acre and compare them by blocks with the costs of the initial eradication. Generally the 1930 curve falls below the 1926 and 1927 curves, and where they do not, it will be seen by following down the same ordinate to the curves for Ribes per acre just below, that in most cases the bushes per acre have increased the second time. This offers a partial explanation of a rise in costs. Another cause is irregularities in methods of crew work on a few blocks at the beginning of the season.

TABLE NO. 8

RE-EXAMINATION COSTS

| Pradication
Type | Acres | Man-
Days | Ribes
Exadif-
cated | Number
Per
Acre | Costs | | Per Cent of Total | | |
|---------------------|-------|--------------|---------------------------|-----------------------|------------|-------------|-------------------|-------|-------|
| | | | | | Per Type | Per
Acre | | | |
| | | | | | | | Cost | Ribes | |
| 1927 Area | | | | | | | | | |
| SE-Yr CO | 2,034 | 73-7/8 | 12,240 | 6.0 | \$537.10 | 40.26 | 21.3 | 53.6 | 13.6 |
| SE-Fir CO | 1,016 | 210-7/8 | 43,296 | 42.6 | 1,533.15 | 1.51 | 60.8 | 31.7 | 48.3 |
| Stream CO | 150 | 62 | 34,130 | 227.5 | 450.77 | 3.01 | 17.9 | 4.7 | 38.1 |
| Totals | 3,200 | 346-3/4 | 89,666 | 28.0 | \$2,521.02 | 40.79 | 100.0 | 100.0 | 100.0 |
| 1926 Area | | | | | | | | | |
| SE-Yr CO | 751 | 81-7/8 | 7,357 | 9.8 | \$595.27 | 31.79 | 21.8 | 26.6 | 8.1 |
| SE-Yr Mature | 340 | 1-3/4 | 530 | 0.9 | 12.72 | 0.04 | 0.5 | 13.0 | 0.3 |
| SE-Fir CO | 1,071 | 153-3/8 | 43,827 | 40.7 | 1,187.31 | 1.11 | 43.6 | 40.8 | 47.8 |
| *SE-Fir Mat. | 127 | 43-1/2 | 4,174 | 30.5 | 315.27 | 2.31 | 11.6 | 5.2 | 4.6 |
| Stream CO | 326 | 84-3/8 | 30,760 | 109.7 | 613.44 | 1.88 | 22.5 | 12.4 | 39.2 |
| Totals | 2,625 | 374-7/8 | 91,244 | 34.8 | \$2,725.51 | 31.04 | 100.0 | 100.0 | 100.0 |
| Both Areas | | | | | | | | | |
| SE-Yr CO | 2,785 | 155-3/4 | 19,607 | 7.0 | \$1,152.37 | 30.41 | 21.6 | 47.8 | 10.8 |
| SE-Yr Mature | 340 | 1-3/4 | 530 | 0.9 | 12.72 | 0.04 | 0.2 | 5.8 | 0.3 |
| SE-Fir CO | 2,097 | 374-1/4 | 86,922 | 41.6 | 2,720.96 | 1.30 | 51.9 | 35.8 | 48.0 |
| *SE-Fir Mat. | 137 | 43-1/2 | 4,174 | 30.3 | 315.27 | 2.31 | 6.0 | 2.4 | 2.3 |
| Stream CO | 476 | 146-3/8 | 69,846 | 146.8 | 1,064.21 | 2.24 | 20.3 | 8.2 | 38.7 |
| Totals | 5,825 | 721-5/8 | 190,909 | 31.0 | \$5,245.53 | 30.90 | 100.0 | 100.0 | 100.0 |

* A brushy timber area not typical of the type.

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The significant thing brought out is that the average per acre cost of re-eradication is less than half that of original eradication.

F. Statement and Analysis of Costs

Actual field expenditures from which costs per acre were computed are analyzed and allocated to re-eradication and special studies in table 9.

| | | Re-eradication | Special Studies | Total |
|--|------------|----------------|-----------------|------------|
| Supervision | | | | |
| Salaries..... | \$752.78 | | | |
| Expenses..... | 179.24 | | | |
| | | \$932.02 | | \$932.02 |
| Travel | | | | |
| Expenses..... | | \$1,127.50 | \$1,000.00 | \$2,127.50 |
| Materials | | | | |
| Cost of food..... | \$1,910.89 | | | |
| Cooks' wages..... | 633.33 | | | |
| Transportation..... | 74.27 | | | |
| Total..... | \$2,487.99 | | | |
| Winnipeg charge to Chemical and Ecology Projects | 423.39 | | | |
| | | \$2,911.38 | \$1,000.00 | \$3,911.38 |
| Transportation of men | | | | |
| Transportation of chemicals | | | | |
| Unplanned transportation | | | | |
| Trains | | | | |
| Trains..... | \$337.00 | | | |
| Other..... | 46.24 | | | |
| | | \$383.24 | | \$383.24 |
| Trains | | | | |
| Trains..... | \$12.37 | | | |
| Transportation of men | | | | |
| Transportation of chemicals | | | | |
| Unplanned transportation | | | | |
| Trains | | | | |
| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
| | | \$12.37 | | \$12.37 |
| Trains | | | | |
| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
| | | \$12.37 | | \$12.37 |
| Trains | | | | |
| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
| | | \$12.37 | | \$12.37 |
| Trains | | | | |
| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
| | | \$12.37 | | \$12.37 |
| Trains | | | | |
| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
| | | \$12.37 | | \$12.37 |
| Trains | | | | |
| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
| | | \$12.37 | | \$12.37 |
| Trains | | | | |
| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
| | | \$12.37 | | \$12.37 |
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| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
| | | \$12.37 | | \$12.37 |
| Trains | | | | |
| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
| | | \$12.37 | | \$12.37 |
| Trains | | | | |
| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
| | | \$12.37 | | \$12.37 |
| Trains | | | | |
| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
| | | \$12.37 | | \$12.37 |
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| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
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| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
| | | \$12.37 | | \$12.37 |
| Trains | | | | |
| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
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| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
| | | \$12.37 | | \$12.37 |
| Trains | | | | |
| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
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| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
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| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
| | | \$12.37 | | \$12.37 |
| Trains | | | | |
| Trains..... | \$12.37 | | | |
| Other..... | 46.24 | | | |
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There is no other way to find out if the person is really
a member of the party. The only way to find out is to ask the person
himself.

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Table 10 given the TABLE NO. 9
January 1 to September 30, 1934

FIELD EXPENDITURES (MAY 11 TO SEPTEMBER 15, 1934) FROM WHICH
COSTS PER ACRE WERE COMPUTED

PROJECT EXPENDITURES - JANUARY 1 TO SEPTEMBER 30, 1934

| Expenditure Classification | Re-
Eradication | Special
Studies | Both | % of
Total |
|--|--------------------|--------------------|-------------------|---------------|
| Supervision | | | | |
| Salaries..... \$752.78 | | | | |
| Expenses..... 179.14 | | | | |
| | \$931.92 | - | \$931.92 | 12.4 |
| Labor | | | | |
| Temporary Assistants | 2,316.60 | \$1,325.86 | 3,642.46 | 48.5 |
| Subsistence | | | | |
| Cost of Food..... \$1,810.39 | | | | |
| Cooks' wages..... 603.33 | | | | |
| Transportation..... 74.27 | | | | |
| Total..... \$2,487.99 | | | | |
| *Minus charge to Chemical
and Ecology Projects 423.39 | | | | |
| | 1,313.05 | 751.51 | 2,064.56 | 27.6 |
| Transportation of men | 64.86 | 37.12 | 101.97 | 1.4 |
| Transportation of chemicals | - | 25.01 | 25.01 | 0.3 |
| Miscellaneous Transportation | 53.49 | - | 53.49 | 0.7 |
| Supplies | | | | |
| Twine..... \$67.84 | | | | |
| Other..... 46.24 | | | | |
| Groceries, non-bld | 114.18 | - | 114.18 | 1.6 |
| Chemicals (wash water, on bill) | - | 66.64 | 66.64 | 0.9 |
| Equipment | | | | |
| Transportation..... 130.07 | | | | |
| Depreciation charge... 252.33 | 302.40 | | | |
| Special experimental | - | 56.92 | 44.32 | 6.0 |
| Miscellaneous Expenses | 60.00 | - | 60.00 | 0.8 |
| Total | \$5,246.58 | \$2,263.06 | \$7,509.64 | 100.0 |

Re-eradication expenses - Expenses incurred by re-eradication only.

Special studies expenses - Expenses resulting from experimental work not connected with re-eradication.

*Subsistence charges incurred by projects 2.45 and 2.3-1. It should be noted that the charges for food and other supplies are not included in the computation of the costs per acre of the various portions of the areas under consideration. Subsequent re-eradication and ecological studies should be undertaken to provide more complete data.

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| Expenditure Classification | Expenditure | Both | % of Total |
|---|-------------|----------|------------|
| Salaries..... | \$733.78 | | |
| Expenses..... | 179.14 | \$911.92 | 13.4 |
| Temporary assistance | 2,311.60 | 2,311.60 | 48.9 |
| Cost of food..... | \$1,810.39 | | |
| Costs, wages..... | 201.37 | | |
| Transportation..... | 74.27 | | |
| Total..... | \$3,487.99 | | |
| minus charge to Chemical and Ecology projects | 423.39 | | |
| | 1,111.07 | 1,111.07 | 27.5 |
| Transportation of mail | 24.00 | 24.00 | 1.4 |
| Transportation of chemicals | - | 22.01 | 0.3 |
| Miscellaneous Transportation | 21.42 | - | 0.3 |
| Supplies | | | |
| Travel..... | 487.34 | | |
| Overhead..... | 43.38 | | |
| | 111.13 | - | 1.5 |
| Chemicals | - | 22.04 | 0.3 |
| Miscellaneous | | | |
| Transportation..... | 131.07 | | |
| Expenditure on..... | 221.37 | | |
| Special experiments | - | 22.93 | 8.0 |
| Miscellaneous expenses | 22.00 | - | 1.4 |
| Total | 6,466.83 | 6,466.83 | 100.0 |

Re-education expenses - expenses incurred by re-education only.
Special studies expenses - expenses incurred from experimental work not connected with re-education.

* Subsidies charges incurred by projects 2.45 and 2.5-1.

Table 10 gives the total expenditures for project 2.25 from January 1 to September 30, 1930.

TABLE NO. 10

PROJECT EXPENDITURES - JANUARY 1 TO SEPTEMBER 30, 1930

| Expenditure Classification | Amount |
|---------------------------------------|------------|
| Supervision | \$1,457.76 |
| Temporary assistants | 4,245.79 |
| Travel Expenses | 463.92 |
| Subsistence Supplies | 1,810.39 |
| Other Supplies | 123.11 |
| New equipment | 101.91 |
| Transportation Supplies and Equipment | 121.44 |
| Miscellaneous Expenses | 37.57 |
| Total Expenditures | \$8,419.96 |

Subsistence costs are itemized in table 11.

TABLE NO. 11

SUBSISTENCE COSTS

| Subsistence Classification | Sub-total | Total |
|----------------------------|------------|------------|
| Groceries, bid items | \$1,343.91 | - |
| Groceries, non-bid | 141.57 | - |
| Fresh meat, on bid | 324.91 | - |
| Total food | - | \$1,810.39 |
| Cooks' wages | - | 803.32 |
| Transportation of food | - | 74.27 |
| Total subsistence cost | - | \$2,687.98 |

Number of meals served.....6,417

Cost per meal.....\$0.388

G. Future Work

The finding of many bushes of 1930 germination, especially on recently logged areas, and the inference that germination of stored seed will continue for a number of years lead to the conclusion that another re-eradication should be undertaken within three or four years at least on portions of the areas under consideration. Subsequent re-eradications and ecological studies should be undertaken to provide more complete

Table 10 gives the total expenditures for the year 1955, January 1 to December 31, 1955.

TABLE 10

PROJECT EXPENDITURES - JANUARY 1 TO DECEMBER 31, 1955

| Category | Amount |
|--------------|-------------------|
| Construction | \$1,000.00 |
| Equipment | 4,000.00 |
| Travel | 400.00 |
| Telephone | 1,000.00 |
| Other | 100.00 |
| Total | \$6,400.00 |

Expenditures are listed in Table 10.

TABLE 11

PROJECT REVENUE

| Category | Amount |
|--------------|-------------------|
| Construction | \$1,000.00 |
| Equipment | 4,000.00 |
| Travel | 400.00 |
| Telephone | 1,000.00 |
| Other | 100.00 |
| Total | \$6,400.00 |

Revenue of each project is listed in Table 11.

TABLE 12

The finding of each project of 1955 construction, especially on the part of the project, and the information that project has of other projects will continue for a number of years. It is the conclusion that project construction should be continued within time of four years at least. The project of the year under consideration. Information for construction and economic studies should be continued for project work complete and

BIOMASS ESTABLISHMENT FOLLOWING LOGGING
SUGAR PINE-FIR TIMBER TYPE STANISLAUS FOREST, CALIF.

comprehensive information on establishment and growth of hibes on eradication areas.

In 1932 and 1933 hibes will have established themselves sufficiently on the experimental eradication area at Borrrington on the Stanislaus forest and at Meador Valley on the Plumas forest to warrant a re-eradication.

B. Summary

The greater part of two seasons' eradication work embracing the 1926 and 1927 experimental areas on the Stanislaus National Forest was freed of hibes by the re-eradication project of 1930. An average of 31 bushes per acre was found compared to 58.5 occurring under natural conditions. The seedling class contained by far the largest percentage of bushes, with, however, a smaller percentage of live stem.

The rate of growth of *B. roezli* in cut-over types is most rapid in sugar pine-fir type where it attains an average growth of forty feet of live stem in four seasons. The highest percentage of seedlings found fruiting was four, a comparatively small figure.

By a system of pre-checking, large blocks were often eliminated from the necessity of coverage by crews, thus materially reducing costs.

MISCELLANEOUS EXPERIMENTS

Under miscellaneous experiments is included other experimental work done on the Stanislaus forest by the re-eradication project. Some of the studies were conducted in cooperation with the ecology and chemical investigation projects. A discussion of the objectives and results of these studies follows.

1. A study of hibes establishment following logging. An attempt to shed light on the rate of hibes establishment following logging by classifying re-eradication data according to year of logging was not productive of satisfying results. The use of more complete and reliable material collected by the California ecology project in 1933 suggested itself, and this material was accordingly worked up with the new end in view, and is presented in chart 5.

Chart 5 illustrates by diagram the number of hibes and the corresponding amount of live stem occurring per acre segregated according to year of origin following logging on sugar pine-fir timber type. The percentages of the total number of bushes and of the total amount of live stem for each year are given at the top of each bar.

...on the basis of the results of the investigation...

In 1935 and 1936 the work was continued in the same direction as in 1934, but with more extensive investigations in the same areas...

2. Summary

The results of the investigation in 1935 and 1936 are summarized in the following table. The average of the results of the investigation in 1934, 1935 and 1936 is given in the last column of the table.

The rate of growth of the trees in the study area is given in the following table. The results of the investigation in 1934, 1935 and 1936 are given in the last column of the table.

It is evident from the results of the investigation that the growth of the trees in the study area is very rapid and that the results of the investigation in 1934, 1935 and 1936 are very satisfactory.

3. Discussion

Under the conditions of the investigation the results of the investigation in 1934, 1935 and 1936 are very satisfactory and the results of the investigation in 1934, 1935 and 1936 are very satisfactory.

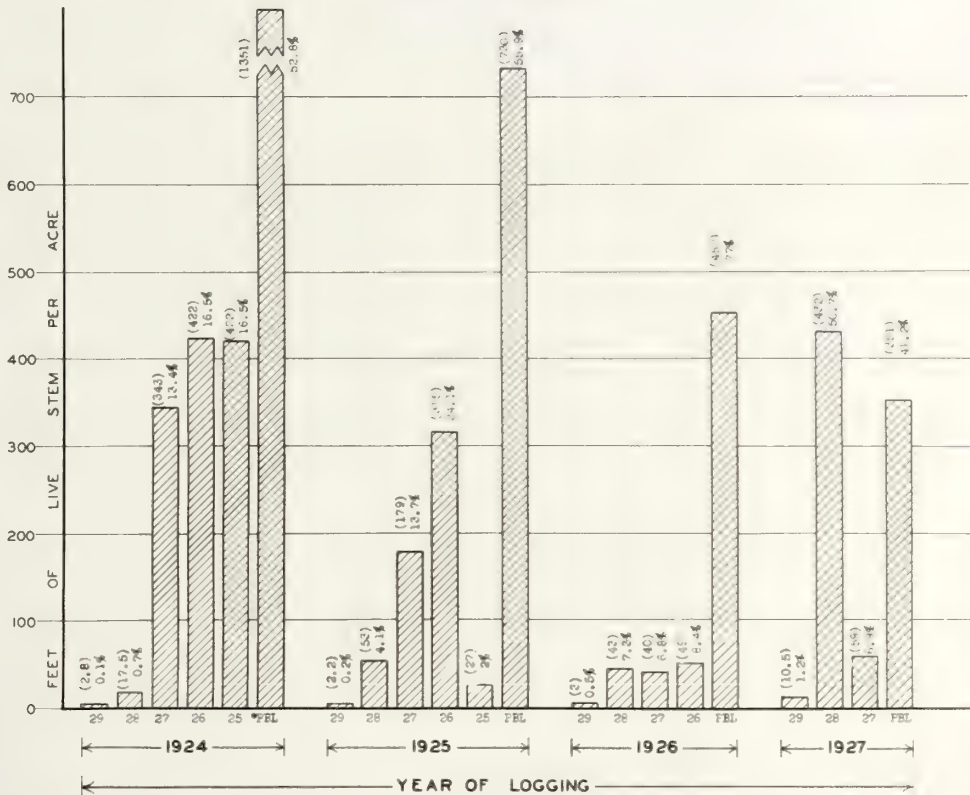
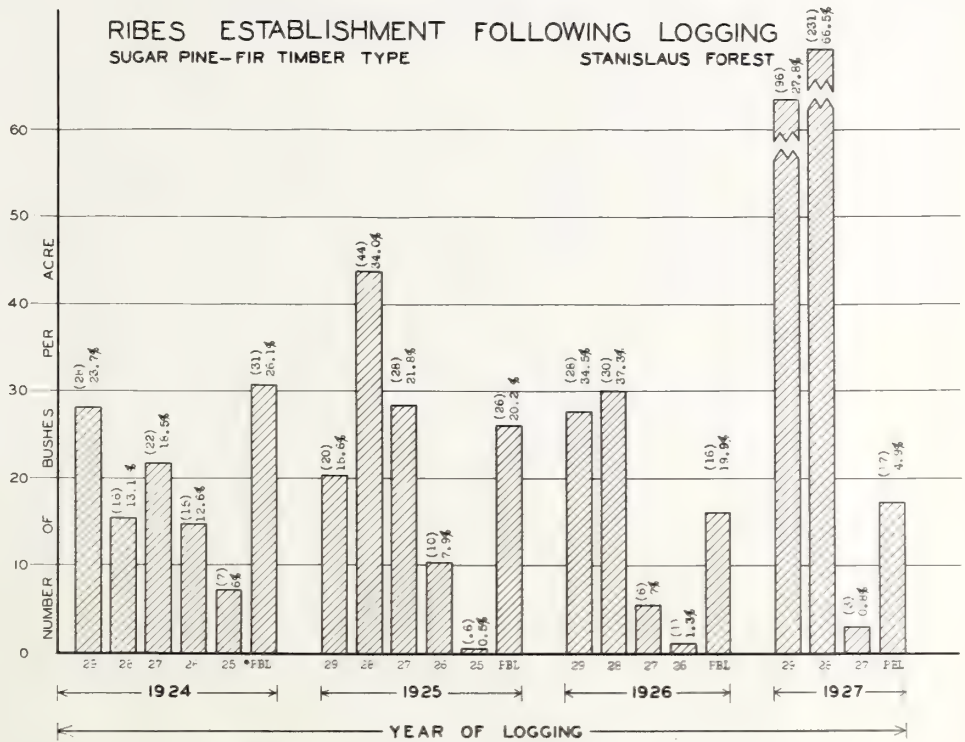
1. A study of the results of the investigation in 1934, 1935 and 1936 shows that the growth of the trees in the study area is very rapid and that the results of the investigation in 1934, 1935 and 1936 are very satisfactory.

2. A study of the results of the investigation in 1934, 1935 and 1936 shows that the growth of the trees in the study area is very rapid and that the results of the investigation in 1934, 1935 and 1936 are very satisfactory.

CHART 5

RIBES ESTABLISHMENT FOLLOWING LOGGING SUGAR PINE-FIR TIMBER TYPE

STANISLAUS FOREST



*Present before logging.

Figures in parenthesis represent bushes per acre and feet of live-stem per acre.

There is apparently a lapse of one to two years after logging before Ribes start appearing on an area in large numbers, at which time, and continuing for three or four years, heavy crops of seedlings are produced. Most of the live stem, however, even on cuttings 4 and 5 years old, is represented by the old plants which were present before logging.

Table 12 shows the number of Ribes used as a basis for chart 8.

TABLE No. 12

DATA USED AS BASIS FOR CHART 5

| Year of Logging | Number of Bushes | | | | | | Total | Acres |
|-----------------|------------------|-------|------|------|------|----------|-------|-------|
| | 1929 | 1925 | 1927 | 1926 | 1928 | P. S. I. | | |
| 1924 | 136 | 109 | 153 | 104 | 50 | 216 | 628 | 7.0 |
| 1925 | 253 | 575 | 363 | 135 | 2 | 341 | 1,631 | 13.1 |
| 1926 | 247 | 267 | 50 | 5 | - | 142 | 715 | 8.9 |
| 1927 | 135 | 323 | 4 | - | - | 24 | 486 | 1.4 |
| Total | 841 | 1,274 | 575 | 244 | 56 | 723 | 3,720 | 39.4 |

*Present before logging.

2. A study of the effect of speed on crew work. The primary purpose of this study was to see if eradication costs could be reduced without seriously affecting the efficiency of the work by reducing the time spent in searching for Ribes.

Both upper and lower surfaces of all leaves as well as all conditions were established in sugar pine-fir type. The same 3-man crew was used to eradicate the Ribes from each plot. On the first plot little time was spent in looking for bushes, the object being to proceed at normal walking speed across the area, keeping a sharp lookout for a bush but not making a special effort to search for them. On the second plot the average speed of eradication was maintained, and on the third plot a particularly careful and painstaking gait was followed, the object being to get all the bushes, irrespective of time consumed. All plots were completely checked. Each plot was $3\frac{1}{2}$ acres in size. Table 13 shows the results of the study.

Final results as to the effectiveness of oils as herbicides will not be known until examinations are made in 1931.

Before the end of the 1930 season considerable sprouting was observed on the formation of new leaves as sprayed stems, very small on pitch oil leaf-spray plots. Where pitch oil has been used as a leaf spray

There is apparently a range of one to two years after hatching before birds start roosting in large numbers, at which time and conditions for some or later years, many crops of seedlings are produced. Most of the birds, however, even on colonies 2 and 3 years old, is represented by the old birds which were present before hatching.

Table 12 shows the number of birds seen on 2 nests for about 10.

TABLE NO. 12

DATA USED AS BASIS FOR CHART 5

| Year of hatching | Number of Birds | | | | |
|------------------|-----------------|-------|-------|-------|-------|
| | 1927 | 1928 | 1929 | 1930 | 1931 |
| 1924 | 198 | 102 | 102 | 102 | 828 |
| 1925 | 252 | 252 | 252 | 252 | 1,021 |
| 1926 | 252 | 252 | 252 | 252 | 252 |
| 1927 | 198 | 252 | 252 | 252 | 252 |
| Total | 941 | 1,021 | 1,021 | 1,021 | 2,121 |

Present before looking.

2. A study of the effect of sound on crop yield. The primary purpose of this study was to see if eradication could be reduced without seriously affecting the efficiency of the work by reducing the time spent in searching for birds.

Three areas of equal size and representing similar conditions were established in each plot type. The same 5-man crew was used to eradicate the birds from each plot. On the first plot birds were spent in looking for birds, the object being to produce as normal walking speed across the area, keeping a sharp lookout for birds but not making a special effort to search for them. On the second plot the average speed of eradication was maintained, and on the third plot a particularly careful and painstaking job was followed, the object being to get all the birds, irrespective of time consumed. All plots were equally checked. Each plot was 1/2 acre in size. Table 13 shows the results of the study.

TABLE NO. 13

EFFECT OF SPEED OF CREW WORK

| Crew Speed | Ribes eradicated | F.I.B. eradicated | Ribes missed | F.I.B. missed | Working Time |
|------------|------------------|-------------------|--------------|---------------|----------------|
| Fast | 369 | 5,640 | 82 | 270 | 1 hr. 36 min. |
| Average | 335 | 6,645 | 79 | 150 | 2 hrs. 55 min. |
| Slow | 421 | 5,166 | 35 | 56 | 5 hrs. 10 min. |

This experiment is not of sufficient size to permit definite conclusions. The results point towards a possibility of cost reductions by speeded-up searching time in crew work. However, speeded searching time results in lowered efficiency and this must be taken into consideration in reducing searching time. A repetition of the experiment on a larger scale is needed to fully evaluate the merits of faster travel.

3. A test of oils as Ribicides. This study was suggested by and conducted in cooperation with the chemical investigation project. Its purpose was to test in the field on a comparatively large scale the lethality of various oils to Ribes, as a leaf spray and as a stem and crown application. In chart 6 is shown the locations, type of application, and kind of oil used in the experiments.

In spraying an oil on the leaves of Ribes the standard knapsack and double-action pump outfit developed by the Idaho eradication operation was used. Both upper and lower surfaces of all leaves as well as all exposed stems were coated with oil.

In the application of oil to exposed crowns on areas 1 and 2 the oil was sprayed on the protruding crown after all live stem had been cut away. On area 3 crown applications consisted of spraying the oil to the crown and around the roots without cutting away the tops of the bushes.

In applying to lacerated tops the oil was sprayed on the stems after they had been considerably bruised and broken with a brush hook.

Final results as to the effectiveness of oils as Ribicides will not be known until examinations are made in 1931.

Before the end of the 1930 season considerable sprouting, and in some instances the formation of new leaves on sprayed stems, was noted on pitch oil leaf-spray plots. Where Diesel oil was used as a leaf spray

TABLE NO. 13
 Results of tests of oil in the form of a dust
 on the control of the Colorado potato beetle

| Time of day | Speed of wind | Direction of wind | Amount of oil used | Result |
|-------------|---------------|-------------------|--------------------|--------|
| 7:00 a.m. | 2.0 | S.W. | 1.0 | Good |
| 8:00 a.m. | 2.0 | S.W. | 1.0 | Good |
| 9:00 a.m. | 2.0 | S.W. | 1.0 | Good |
| 10:00 a.m. | 2.0 | S.W. | 1.0 | Good |
| 11:00 a.m. | 2.0 | S.W. | 1.0 | Good |
| 12:00 p.m. | 2.0 | S.W. | 1.0 | Good |
| 1:00 p.m. | 2.0 | S.W. | 1.0 | Good |
| 2:00 p.m. | 2.0 | S.W. | 1.0 | Good |
| 3:00 p.m. | 2.0 | S.W. | 1.0 | Good |
| 4:00 p.m. | 2.0 | S.W. | 1.0 | Good |
| 5:00 p.m. | 2.0 | S.W. | 1.0 | Good |
| 6:00 p.m. | 2.0 | S.W. | 1.0 | Good |
| 7:00 p.m. | 2.0 | S.W. | 1.0 | Good |
| 8:00 p.m. | 2.0 | S.W. | 1.0 | Good |
| 9:00 p.m. | 2.0 | S.W. | 1.0 | Good |
| 10:00 p.m. | 2.0 | S.W. | 1.0 | Good |
| 11:00 p.m. | 2.0 | S.W. | 1.0 | Good |
| 12:00 a.m. | 2.0 | S.W. | 1.0 | Good |

This experiment is not of sufficient value to justify definite conclusions. The results point towards a possibility of some reduction in the number of beetles on the plants. However, the results are not sufficient to justify a recommendation of the use of oil in the form of a dust. A further experiment is being conducted on a larger scale to determine the value of this method.

3. A test of oil in the form of a dust. This test was conducted in cooperation with the Colorado potato beetle. The purpose was to test the effect of oil in the form of a dust on the Colorado potato beetle. The results of this test are given in Table No. 14. It is seen from this table that the use of oil in the form of a dust has a marked effect on the Colorado potato beetle. The results of this test are given in Table No. 14.

4. A test of oil in the form of a dust. This test was conducted in cooperation with the Colorado potato beetle. The purpose was to test the effect of oil in the form of a dust on the Colorado potato beetle. The results of this test are given in Table No. 15. It is seen from this table that the use of oil in the form of a dust has a marked effect on the Colorado potato beetle. The results of this test are given in Table No. 15.

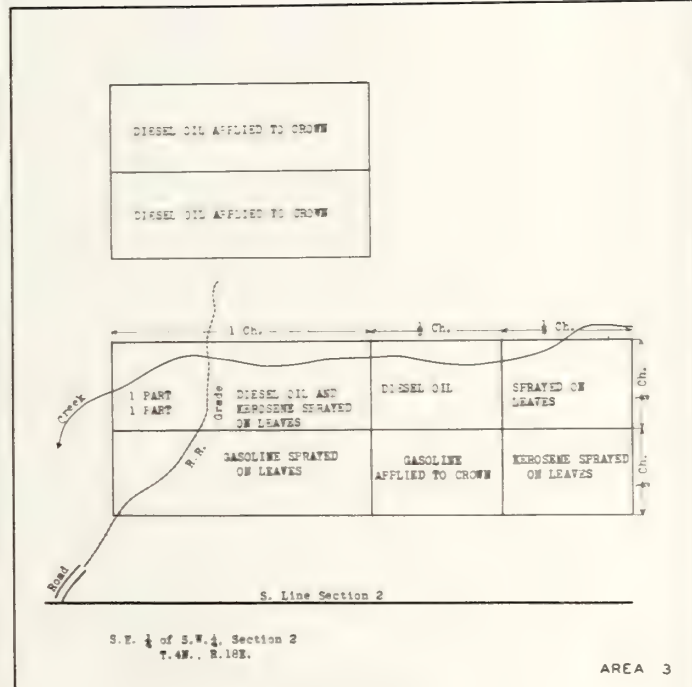
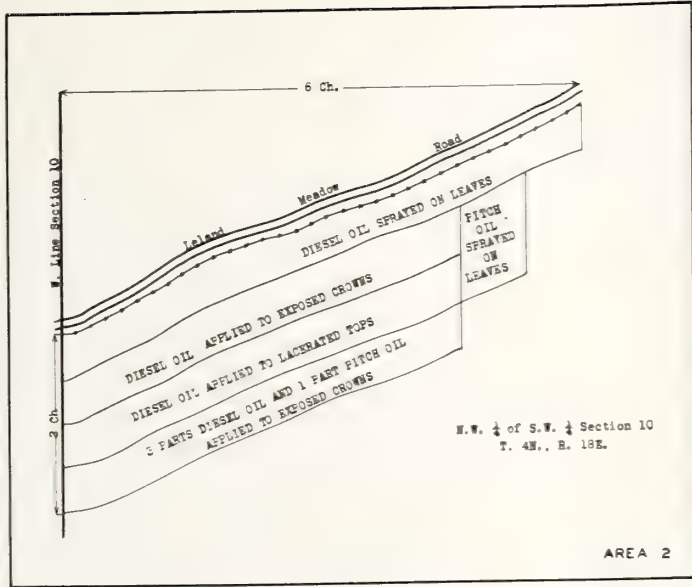
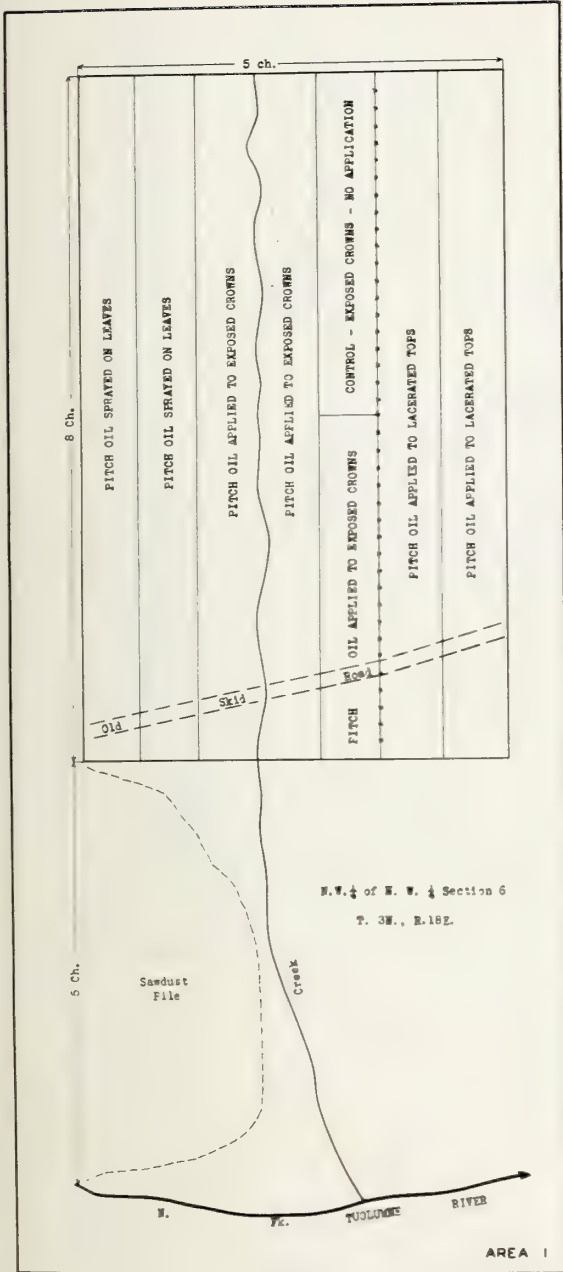
5. A test of oil in the form of a dust. This test was conducted in cooperation with the Colorado potato beetle. The purpose was to test the effect of oil in the form of a dust on the Colorado potato beetle. The results of this test are given in Table No. 16. It is seen from this table that the use of oil in the form of a dust has a marked effect on the Colorado potato beetle. The results of this test are given in Table No. 16.

6. A test of oil in the form of a dust. This test was conducted in cooperation with the Colorado potato beetle. The purpose was to test the effect of oil in the form of a dust on the Colorado potato beetle. The results of this test are given in Table No. 17. It is seen from this table that the use of oil in the form of a dust has a marked effect on the Colorado potato beetle. The results of this test are given in Table No. 17.

7. A test of oil in the form of a dust. This test was conducted in cooperation with the Colorado potato beetle. The purpose was to test the effect of oil in the form of a dust on the Colorado potato beetle. The results of this test are given in Table No. 18. It is seen from this table that the use of oil in the form of a dust has a marked effect on the Colorado potato beetle. The results of this test are given in Table No. 18.

8. A test of oil in the form of a dust. This test was conducted in cooperation with the Colorado potato beetle. The purpose was to test the effect of oil in the form of a dust on the Colorado potato beetle. The results of this test are given in Table No. 19. It is seen from this table that the use of oil in the form of a dust has a marked effect on the Colorado potato beetle. The results of this test are given in Table No. 19.

CHART 6



OIL APPLICATION AREAS

no spreading or re-lining was noted at the time of the 1930 season.
No re-growth was noted on other plots.

4. A study is being made the efficacy of using oil in eradication work. Should oil prove sufficiently lethal to lice to warrant their use as indicated, would there be any less expensive than present grubbing methods? What are the limitations on the use of oil with reference to louse conditions and working conditions? To get an answer to these questions the following experiment was undertaken:

Five plots were laid out in different representative areas of heavy louse. A 5-mm cover, each was equipped with standard measuring and spray pump outfit (with special small outlet as pump to control full penetration of oil), was used over each plot to spray all louse. Spray was applied liberally to leaves and stems. Individual living and dead were laid out in advance of spraying. Diesel oil was used because of its availability and insecticidal properties. After the spraying job was completed a grubbing crew went over the plot and grubbed out all louse.

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 ...TABLE NO. 14 ...
 ...OIL SPRAYING ...
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 ...are shown ...

| Plot No. | Acres | Number Live Stems on Plot | Number Live Stems on Plot | Number Live Stems on Plot |
|----------|-------|---------------------------|---------------------------|---------------------------|
| 1 | 3.8 | 557 | 15,333 | 147 |
| 2 | 3.8 | 764 | 15,594 | 201 |
| 3 | 7.0 | 921 | 16,534 | 131 |
| 4 | 16.5 | 5,017 | 87,504 | 304 |
| 5 | 6.0 | 2,068 | 41,330 | 344 |
| Total | 37.1 | 9,325 | 177,528 | 201 |

...since 1927 ...

| Plot No. | Acres | Number Live Stems on Plot | Number Live Stems on Plot | Number Live Stems on Plot | Man-Days to Spray | Gallons of Oil Used | Man-Days to Grub | Cost Per Acre for Spraying | Cost Per Acre for Grubbing |
|----------|-------|---------------------------|---------------------------|---------------------------|-------------------|---------------------|------------------|----------------------------|----------------------------|
| 1 | 3.8 | 557 | 15,333 | 147 | 3.0 | 78 | 2.13 | 17.45 | 33.46 |
| 2 | 3.8 | 764 | 15,594 | 201 | 1.75 | 51 | 2.62 | 4.56 | 4.28 |
| 3 | 7.0 | 921 | 16,534 | 131 | 2.63 | 65 | 4.0 | 3.45 | 3.53 |
| 4 | 16.5 | 5,017 | 87,504 | 304 | 11.5 | 276 | 13.1 | 6.44 | 4.91 |
| 5 | 6.0 | 2,068 | 41,330 | 344 | 3.0 | 83 | 7.0 | 4.83 | 7.21 |
| Total | 37.1 | 9,325 | 177,528 | 201 | 21.98 | 532 | 28.86 | 15.53 | 15.08 |

*An area of large old bushes; other areas contained young bushes.

One gallon of oil was used on each 17 bushes, or one gallon of oil for 222 feet of live stem, or 1/2 pint of oil per 20 feet of live stem.

| Plot No. | Acres | Number Live Stems on Plot | Number Live Stems on Plot | Number Live Stems on Plot |
|----------|-------|---------------------------|---------------------------|---------------------------|
| 1 | 3.8 | 557 | 15,333 | 147 |
| 2 | 3.8 | 764 | 15,594 | 201 |
| 3 | 7.0 | 921 | 16,534 | 131 |
| 4 | 16.5 | 5,017 | 87,504 | 304 |
| 5 | 6.0 | 2,068 | 41,330 | 344 |
| Total | 37.1 | 9,325 | 177,528 | 201 |

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Table 14 shows the results of the 5 experiments. In computing costs per acre Diesel oil was figured at 8¢ per gallon (the wholesale cost at Sonora, California) and transportation of oil was charged against spraying costs as incurred. No charge was made for spraying equipment. This area with a similar ad-

The results of these experiments indicate that the employment of oils as sprays in California, aside from considerations of their toxicity as herbicides will likely be limited. Their field of use may be widened by reductions in the cost and transportation of oil, and by further experience in their application. Transportation costs incurred in the experiments were minimum since all plots were located contiguous to automobile roads.

Bushes that have been sprayed with either Diesel oil or pitch oil will burn readily 2 months after spraying, and recently sprayed areas are highly inflammable. The danger of fire is therefore a factor to be considered in the employment of oils.

Injections of oils or chemicals into stems and crowns of Ribes may prove more desirable than oil sprays to aerial parts of the plants. Such experiments are being undertaken by the chemical investigations project.

5. A summary of Ribes eradication work on small unworked area between the 1926 and 1927 experimental eradication areas. This area (see cross-hatched area on map) was a part of the original 1927 experimental eradication unit. It was not worked in 1927 because of interference by logging operations. The summarized results of eradication on the area are shown in table 15.

TABLE NO. 15

SUMMARY OF ERADICATION

| Cut-over Type | Acres | Man-Days | Ribes eradicated | | | Average Number Per Acre | Cost Per Acre |
|---------------|-------|----------|------------------|--------------|----------|-------------------------|---------------|
| | | | R. roezli | R. nevadense | Total | | |
| S.F.-F. | 173 | 65 | 20,858 | 2,757 | * 23,615 | 136 | \$3.30 |
| Stream | 10 | 10 | 3,077 | 9,911 | **12,988 | 1,299 | 6.18 |
| Total | 183 | 75 | 23,935 | 12,668 | 36,603 | 198 | \$2.51 |

*In sugar pine-fir type 87.7 per cent of Ribes were seedlings originating since 1927.

**In stream type 95.0 per cent of Ribes were seedlings originating since 1927.

Table 16 shows a comparison of costs and ribes per acre for this area with a similar adjoining area reworked this season, and on which an eradication was performed just before logging.

| Area | Type of treatment | 1937 | | | 1938 | | | Total | Ribes per acre |
|------------|-------------------------|-------------|----------|----------------|-------------|----------|----------------|-------|----------------|
| | | Area, acres | Cost, \$ | Yield, bushels | Area, acres | Cost, \$ | Yield, bushels | | |
| Area No. 1 | White flaking | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 2.00 | 1.00 |
| | Hand weeding & grubbing | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 2.00 | 1.00 |
| Area No. 2 | White flaking | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 2.00 | 1.00 |
| | Hand weeding & grubbing | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 2.00 | 1.00 |
| Total | | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 8.00 | 4.00 |

*Area No. 1 - Ribes eradicated in 1937, reworked in 1938.
 *Area No. 2 - Ribes eradicated in 1937, no work.

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TABLE NO. 16

RELATION OF TIME OF ERADICATION TO LOGGING WITH RESPECT TO NIBES ESTABLISHMENT
AND COSTS ON EQUALITY 4-FIR AND STRIPE TYPES

| Area* | Time of eradication | 5-F.-Fir Type | | | Stream Type | | | Average | |
|-------|---|---------------|----------------|----------------|-------------|----------------|----------------|----------------|----------------|
| | | Acres | Nibes Per Acre | Costs Per Acre | Acres | Nibes Per Acre | Costs Per Acre | Nibes Per Acre | Costs Per Acre |
| No. 1 | Just before logging | 169 | 81 | \$2.22 | 36 | 90 | \$2.85 | 204 | \$6 |
| | reworked 3 years later | | 87 | 1.69 | | 663 | 2.63 | | 168 |
| | Total for area | 169 | 148 | \$3.91 | 36 | 653 | \$7.48 | 204 | \$4.63 |
| No. 2 | First eradication 3 years after logging | 175 | 135 | \$2.30 | 10 | 1,299 | \$6.18 | 185 | \$2.51 |

*Area No. 1 - Nibes eradicated in 1927, reworked in 1930.

*Area No. 2 - Nibes eradicated in 1930, no rework.

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In every case it is seen that the per acre costs for area No. 2, where one eradication followed logging, are lower than the combined costs of eradication and re-eradication for area No. 1. The average number of Ribes per acre is less on area No. 2 than on area No. 1, although there is a greater number in the stream type of area No. 2. While no sweeping conclusions can be drawn from this comparison, these data indicate that an eradication operation should be delayed until after logging. However, a comparison of subsequent eradications on both areas is essential to a complete understanding of the most advantageous time of eradication.

On the basis of present findings, eradication, to be most effective, should take place sufficiently long after logging to permit complete seedling establishment, but before heavy fruiting starts probably 3 or 4 years after logging.

6. Recheck of Forest Service experimental logging areas. Ribes studies were made on these plots in May 1929, at which time all Ribes found on each plot were eradicated. The area on which the plots are located was covered by eradication crews in 1926. (See 1929 annual report for full particulars concerning these plots.)

In August 1930 the second re-eradication survey was made. Table 17 shows the results of this, the second reworking. Subsequent Ribes surveys are planned on these plots. No definite conclusions can be drawn from these studies for several years.

It is very clear that the per acre costs for area No. 2, where the production is lower than the combined costs of production and re-vegetation for area No. 1. The average amount of time per acre is less on area No. 2 than on area No. 1. Although there is a greater number in the stream type of area No. 2, this is a special situation and is not true of the combined area. This fact indicates that an artificial situation exists in the area which is being compared. However, a comparison of the stream type of area No. 2 with the stream type of area No. 1 is not a fair comparison at all.

On the basis of present findings, eradication, to be most effective, should take place sufficiently long after logging to permit complete seedling establishment, but before heavy foresting stands develop to a point where logging is no longer feasible.

A. Location of areas for experimental logging areas. Since the areas were selected on the basis of the 1938, at which time all areas found in the area were considered. The area on which the plots are located was covered by vegetation in 1938. (See also annual report for 1938 for details of the selection process.)

In 1938 the areas were selected on the basis of the 1938, at which time all areas found in the area were considered. The area on which the plots are located was covered by vegetation in 1938. (See also annual report for 1938 for details of the selection process.)

BUEHNS PLOTTED BUT NOT TRADICATED

| Plot No. | Seedlings | | | | Sprouts | | | | Grafted | | | | Total Bushes for Plot | | | | Acres in Plot | | | | |
|----------|-----------|--------|---------|--------|-----------|--------|-----------|--------|-----------|--------|---------|--------|-----------------------|--------|---------|--------|---------------|------|-----|-------|----|
| | E. roezli | | n. nev. | | E. roezli | | K. roezli | | E. roezli | | n. nev. | | E. roezli | | n. nev. | | | | | | |
| | Bu. | F.L.S. | Bu. | F.L.S. | Bu. | F.L.S. | Bu. | F.L.S. | Bu. | F.L.S. | Bu. | F.L.S. | Bu. | F.L.S. | Bu. | F.L.S. | | | | | |
| 11* | 351 | 105.1 | 7 | 2.6 | 358 | 107.7 | 4 | 1.2 | 29 | 74.4 | 1 | 1.0 | 30 | 75.4 | 384 | 180.7 | 8 | 3.6 | 392 | 184.3 | 13 |
| 10 | 131 | 51.6 | 43 | 12.9 | 174 | 64.5 | 1 | 6.5 | 47 | 139.6 | 18 | 45.3 | 65 | 182.9 | 179 | 197.7 | 61 | 56.2 | 240 | 253.9 | 15 |
| 9 | 1 | .4 | - | - | 1 | .4 | 1 | 12.0 | 2 | 15.5 | - | - | 2 | 15.5 | 4 | 27.9 | - | - | 4 | 27.9 | 15 |
| Total | 483 | 157.1 | 50 | 15.5 | 533 | 172.5 | 6 | 19.7 | 78 | 229.5 | 19 | 44.3 | 97 | 273.8 | 567 | 405.3 | 69 | 59.8 | 636 | 465.1 | 43 |

*No. 11. heavily logged; No. 10. economic cutting. No. 9. forest service cutting.

*No. 11. heavily logged; No. 10. economic cutting.

*No. 11. heavily locked; No. 10.

• NO. 11.

investigation of the original survey of the commercial timberlands of the Ribes and sugar pine relation to the spread of the pest provides a basis upon which to protect sugar pine forest.

It was selected because of the
gap in the gap between the
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lies on the west slope of the
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Told Base Mt. Division. The
is was dividing it into a series
southern end and progressing north
south forks of the River on
can River, Silver Creek, the
then an alluvial canyon, and
the middle fork of the river
the river have been far traveled
and north road system, so that
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| NO. 17. REVALLY FORGED: NO. 10. ECONOMIC COUNTRY: NO. 1 | 1884 | 1885 | 1886 | 1887 | 1888 | 1889 | 1890 | 1891 | 1892 | 1893 | 1894 | 1895 | 1896 | 1897 | 1898 | 1899 | 1900 | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 | 1908 | 1909 | 1910 | 1911 | 1912 | 1913 | 1914 | 1915 | 1916 | 1917 | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 | 2100 | 2101 | 2102 | 2103 | 2104 | 2105 | 2106 | 2107 | 2108 | 2109 | 2110 | 2111 | 2112 | 2113 | 2114 | 2115 | 2116 | 2117 | 2118 | 2119 | 2120 | 2121 | 2122 | 2123 | 2124 | 2125 | 2126 | 2127 | 2128 | 2129 | 2130 | 2131 | 2132 | 2133 | 2134 | 2135 | 2136 | 2137 | 2138 | 2139 | 2140 | 2141 | 2142 | 2143 | 2144 | 2145 | 2146 | 2147 | 2148 | 2149 | 2150 | 2151 | 2152 | 2153 | 2154 | 2155 | 2156 | 2157 | 2158 | 2159 | 2160 | 2161 | 2162 | 2163 | 2164 | 2165 | 2166 | 2167 | 2168 | 2169 | 2170 | 2171 | 2172 | 2173 | 2174 | 2175 | 2176 | 2177 | 2178 | 2179 | 2180 | 2181 | 2182 | 2183 | 2184 | 2185 | 2186 | 2187 | 2188 | 2189 | 2190 | 2191 | 2192 | 2193 | 2194 | 2195 | 2196 | 2197 | 2198 | 2199 | 2200 | 2201 | 2202 | 2203 | 2204 | 2205 | 2206 | 2207 | 2208 | 2209 | 2210 | 2211 | 2212 | 2213 | 2214 | 2215 | 2216 | 2217 | 2218 | 2219 | 2220 | 2221 | 2222 | 2223 | 2224 | 2225 | 2226 | 2227 | 2228 | 2229 | 2230 | 2231 | 2232 | 2233 | 2234 | 2235 | 2236 | 2237 | 2238 | 2239 | 2240 | 2241 | 2242 | 2243 | 2244 | 2245 | 2246 | 2247 | 2248 | 2249 | 2250 | 2251 | 2252 | 2253 | 2254 | 2255 | 2256 | 2257 | 2258 | 2259 | 2260 | 2261 | 2262 | 2263 | 2264 | 2265 | 2266 | 2267 | 2268 | 2269 | 2270 | 2271 | 2272 | 2273 | 2274 | 2275 | 2276 | 2277 | 2278 | 2279 | 2280 | 2281 | 2282 | 2283 | 2284 | 2285 | 2286 | 2287 | 2288 | 2289 | 2290 | 2291 | 2292 | 2293 | 2294 | 2295 | 2296 | 2297 | 2298 | 2299 | 2300 | 2301 | 2302 | 2303 | 2304 | 2305 | 2306 | 2307 | 2308 | 2309 | 2310 | 2311 | 2312 | 2313 | 2314 | 2315 | 2316 | 2317 | 2318 | 2319 | 2320 | 2321 | 2322 | 2323 | 2324 | 2325 | 2326 | 2327 | 2328 | 2329 | 2330 | 2331 | 2332 | 2333 | 2334 | 2335 | 2336 | 2337 | 2338 | 2339 | 2340 | 2341 | 2342 | 2343 | 2344 | 2345 | 2346 | 2347 | 2348 | 2349 | 2350 | 2351 | 2352 | 2353 | 2354 | 2355 | 2356 | 2357 | 2358 | 2359 | 2360 | 2361 | 2362 | 2363 | 2364 | 2365 | 2366 | 2367 | 2368 | 2369 | 2370 | 2371 | 2372 | 2373 | 2374 | 2375 | 2376 | 2377 | 2378 | 2379 | 2380 | 2381 | 2382 | 2383 | 2384 | 2385 | 2386 | 2387 | 2388 | 2389 | 2390 | 2391 | 2392 | 2393 | 2394 | 2395 | 2396 | 2397 | 2398 | 2399 | 2400 | 2401 | 2402 | 2403 | 2404 | 2405 | 2406 | 2407 | 2408 | 2409 | 2410 | 2411 | 2412 | 2413 | 2414 | 2415 | 2416 | 2417 | 2418 | 2419 | 2420 | 2421 | 2422 | 2423 | 2424 | 2425 | 2426 | 2427 | 2428 | 2429 | 2430 | 2431 | 2432 | 2433 | 2434 | 2435 | 2436 | 2437 | 2438 | 2439 | 2440 | 2441 | 2442 | 2443 | 2444 | 2445 | 2446 | 2447 | 2448 | 2449 | 2450 | 2451 | 2452 | 2453 | 2454 | 2455 | 2456 | 2457 | 2458 | 2459 | 2460 | 2461 | 2462 | 2463 | 2464 | 2465 | 2466 | 2467 | 2468 | 2469 | 2470 | 2471 | 2472 | 2473 | 2474 | 2475 | 2476 | 2477 | 2478 | 2479 | 2480 | 2481 | 2482 | 2483 | 2484 | 2485 | 2486 | 2487 | 2488 | 2489 | 2490 | 2491 | 2492 | 2493 | 2494 | 2495 | 2496 | 2497 | 2498 | 2499 | 2500 | 2501 | 2502 | 2503 | 2504 | 2505 | 2506 | 2507 | 2508 | 2509 | 2510 | 2511 | 2512 | 2513 | 2514 | 2515 | 2516 | 2517 | 2518 | 2519 | 2520 | 2521 | 2522 | 2523 | 2524 | 2525 | 2526 | 2527 | 2528 | 2529 | 2530 | 2531 | 2532 | 2533 | 2534 | 2535 | 2536 | 2537 | 2538 | 2539 | 2540 | 2541 | 2542 | 2543 | 2544 | 2545 | 2546 | 2547 | 2548 | 2549 | 2550 | 2551 | 2552 | 2553 | 2554 | 2555 | 2556 | 2557 | 2558 | 2559 | 2560 | 2561 | 2562 | 2563 | 2564 | 2565 | 2566 | 2567 | 2568 | 2569 | 2570 | 2571 | 2572 | 2573 | 2574 | 2575 | 2576 | 2577 | 2578 | 2579 | 2580 | 2581 | 2582 | 2583 | 2584 | 2585 | 2586 | 2587 | 2588 | 2589 | 2590 | 2591 | 2592 | 2593 | 2594 | 2595 | 2596 | 2597 | 2598 | 2599 | 2600 | 2601 | 2602 | 2603 | 2604 | 2605 | 2606 | 2607 | 2608 | 2609 | 2610 | 2611 | 2612 | 2613 | 2614 | 2615 | 2616 | 2617 | 2618 | 2619 | 2620 | 2621 | 2622 | 2623 | 2624 | 2625 | 2626 | 2627 | 2628 | 2629 | 2630 | 2631 | 2632 | 2633 | 2634 | 2635 | 2636 | 2637 | 2638 | 2639 | 2640 | 2641 | 2642 | 2643 | 2644 | 2645 | 2646 | 2647 | 2648 | 2649 | 2650 | 2651 | 2652 | 2653 | 2654 | 2655 | 2656 | 2657 | 2658 | 2659 | 2660 | 2661 | 2662 | 2663 | 2664 | 2665 | 2666 | 2667 | 2668 | 2669 | 2670 | 2671 | 2672 | 2673 | 2674 | 2675 | 2676 | 2677 | 2678 | 2679 | 2680 | 2681 | 2682 | 2683 | 2684 | 2685 | 2686 | 2687 | 2688 | 2689 | 2690 | 2691 | 2692 | 2693 | 2694 | 2695 | 2696 | 2697 | 2698 | 2699 | 2700 | 2701 | 2702 | 2703 | 2704 | 2705 | 2706 | 2707 | 2708 | 2709 | 2710 | 2711 | 2712 | 2713 | 2714 | 2715 | 2716 | 2717 | 2718 | 2719 | 2720 | 2721 | 2722 | 2723 | 2724 | 2725 | 2726 | 2727 | 2728 | 2729 | 2730 | 2731 | 2732 | 2733 | 2734 | 2735 | 2736 | 2737 | 2738 | 2739 | 2740 | 2741 | 2742 | 2743 | 2744 | 2745 | 2746 | 2747 | 2748 | 2749 | 2750 | 2751 | 2752 | 2753 | 2754 | 2755 | 2756 | 2757 | 2758 | 2759 | 2760 | 2761 | 2762 | 2763 | 2764 | 2765 | 2766 | 2767 | 2768 | 2769 | 2770 | 2771 | 2772 | 2773 | 2774 | 2775 | 2776 | 2777 | 2778 | 2779 | 2780 | 2781 | 2782 | 2783 | 2784 | 2785 | 2786 | 2787 | 2788 | 2789 | 2790 | 2791 | 2792 | 2793 | 2794 | 2795 | 2796 | 2797 | 2798 | 2799 | 2800 | 2801 | 2802 | 2803 | 2804 | 2805 | 2806 | 2807 | 2808 | 2809 | 2810 | 2811 | 2812 | 2813 | 2814 | 2815 | 2816 | 2817 | 2818 | 2819 | 2820 | 2821 | 2822 | 2823 | 2824 | 2825 | 2826 | 2827 | 2828 | 2829 | 2830 | 2831 | 2832 | 2833 | 2834 | 2835 | 2836 | 2837 | 2838 | 2839 | 2840 | 2841 | 2842 | 2843 | 2844 | 2845 | 2846 | 2847 | 2848 | 2849 | 2850 | 2851 | 2852 | 2853 | 2854 | 2855 | 2856 | 2857 | 2858 | 2859 | 2860 | 2861 | 2862 | 2863 | 2864 | 2865 | 2866 | 2867 | 2868 | 2869 | 2870 | 2871 | 2872 | 2873 | 2874 | 2875 | 2876 | 2877 | 2878 | 2879 | 2880 | 2881 | 2882 | 2883 | 2884 | 2885 | 2886 | 2887 | 2888 | 2889 | 2890 | 2891 | 2892 | 2893 | 2894 | 2895 | 2896 | 2897 | 2898 | 2899 | 2900 | 2901 | 2902 | 2903 | 2904 | 2905 | 2906 | 2907 | 2908 | 2909 | 2910 | 2911 | 2912 | 2913 | 2914 | 2915 | 2916 | 2917 | 2918 | 2919 | 2920 | 2921 | 2922 | 2923 | 2924 | 2925 | 2926 | 2927 | 2928 | 2929 | 2930 | 2931 | 2932 | 2933 | 2934 | 2935 | 2936 | 2937 | 2938 | 2939 | 2940 | 2941 | 2942 | 2943 | 2944 | 2945 | 2946 | 2947 | 2948 | 2949 | 2950 | 2951 | 2952 | 2953 | 2954 | 2955 | 2956 | 2957 | 2958 | 2959 | 2960 | 2961 | 2962 | 2963 | 2964 | 2965 | 2966 | 2967 | 2968 | 2969 | 2970 | 2971 | 2972 | 2973 | 2974 | 2975 | 2976 | 2977 | 2978 | 2979 | 2980 | 2981 | 2982 | 2983 | 2984 | 2985 | 2986 | 2987 | 2988 | 2989 | 2990 | 2991 | 2992 | 2993 | 2994 | 2995 | 2996 | 2997 | 2998 | 2999 | 3000 |
|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----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|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----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ALBANY, N. Y. 1901. 1902. 1903. 1904. 1905. 1906. 1907. 1908. 1909. 1910. 1911. 1912. 1913. 1914. 1915. 1916. 1917. 1918. 1919. 1920. 1921. 1922. 1923. 1924. 1925. 1926. 1927. 1928. 1929. 1930. 1931. 1932. 1933. 1934. 1935. 1936. 1937. 1938. 1939. 1940. 1941. 1942. 1943. 1944. 1945. 1946. 1947. 1948. 1949. 1950. 1951. 1952. 1953. 1954. 1955. 1956. 1957. 1958. 1959. 1960. 1961. 1962. 1963. 1964. 1965. 1966. 1967. 1968. 1969. 1970. 1971. 1972. 1973. 1974. 1975. 1976. 1977. 1978. 1979. 1980. 1981. 1982. 1983. 1984. 1985. 1986. 1987. 1988. 1989. 1990. 1991. 1992. 1993. 1994. 1995. 1996. 1997. 1998. 1999. 2000. 2001. 2002. 2003. 2004. 2005. 2006. 2007. 2008. 2009. 2010. 2011. 2012. 2013. 2014. 2015. 2016. 2017. 2018. 2019. 2020. 2021. 2022. 2023. 2024. 2025. 2026. 2027. 2028. 2029. 2030. 2031. 2032. 2033. 2034. 2035. 2036. 2037. 2038. 2039. 2040. 2041. 2042. 2043. 2044. 2045. 2046. 2047. 2048. 2049. 2050. 2051. 2052. 2053. 2054. 2055. 2056. 2057. 2058. 2059. 2060. 2061. 2062. 2063. 2064. 2065. 2066. 2067. 2068. 2069. 2070. 2071. 2072. 2073. 2074. 2075. 2076. 2077. 2078. 2079. 2080. 2081. 2082. 2083. 2084. 2085. 2086. 2087. 2088. 2089. 2090. 2091. 2092. 2093. 2094. 2095. 2096. 2097. 2098. 2099. 2100. 2101. 2102. 2103. 2104. 2105. 2106. 2107. 2108. 2109. 2110. 2111. 2112. 2113. 2114. 2115. 2116. 2117. 2118. 2119. 2120. 2121. 2122. 2123. 2124. 2125. 2126. 2127. 2128. 2129. 2130. 2131. 2132. 2133. 2134. 2135. 2136. 2137. 2138. 2139. 2140. 2141. 2142. 2143. 2144. 2145. 2146. 2147. 2148. 2149. 2150. 2151. 2152. 2153. 2154. 2155. 2156. 2157. 2158. 2159. 2160. 2161. 2162. 2163. 2164. 2165. 2166. 2167. 2168. 2169. 2170. 2171. 2172. 2173. 2174. 2175. 2176. 2177. 2178. 2179. 2180. 2181. 2182. 2183. 2184. 2185. 2186. 2187. 2188. 2189. 2190. 2191. 2192. 2193. 2194. 2195. 2196. 2197. 2198. 2199. 2200. 2201. 2202. 2203. 2204. 2205. 2206. 2207. 2208. 2209. 2210. 2211. 2212. 2213. 2214. 2215. 2216. 2217. 2218. 2219. 2220. 2221. 2222. 2223. 2224. 2225. 2226. 2227. 2228. 2229. 2230. 2231. 2232. 2233. 2234. 2235. 2236. 2237. 2238. 2239. 2240. 2241. 2242. 2243. 2244. 2245. 2246. 2247. 2248. 2249. 2250. 2251. 2252. 2253. 2254. 2255. 2256. 2257. 2258. 2259. 2260. 2261. 2262. 2263. 2264. 2265. 2266. 2267. 2268. 2269. 2270. 2271. 2272. 2273. 2274. 2275. 2276. 2277. 2278. 2279. 2280. 2281. 2282. 2283. 2284. 2285. 2286. 2287. 2288. 2289. 2290. 2291. 2292. 2293. 2294. 2295. 2296. 2297. 2298. 2299. 2300. 2301. 2302. 2303. 2304. 2305. 2306. 2307. 2308. 2309. 2310. 2311. 2312. 2313. 2314. 2315. 2316. 2317. 2318. 2319. 2320. 2321. 2322. 2323. 2324. 2325. 2326. 2327. 2328. 2329. 2330. 2331. 2332. 2333. 2334. 2335. 2336. 2337. 2338. 2339. 2340. 2341. 2342. 2343. 2344. 2345. 2346. 2347. 2348. 2349. 2350. 2351. 2352. 2353. 2354. 2355. 2356. 2357. 2358. 2359. 2360. 2361. 2362. 2363. 2364. 2365. 2366. 2367. 2368. 2369. 2370. 2371. 2372. 2373. 2374. 2375. 2376. 2377. 2378. 2379. 2380. 2381. 2382. 2383. 2384. 2385. 2386. 2387. 2388. 2389. 2390. 2391. 2392. 2393. 2394. 2395. 2396. 2397. 2398. 2399. 2400. 2401. 2402. 2403. 2404. 2405. 2406. 2407. 2408. 2409. 2410. 2411. 2412. 2413. 2414. 2415. 2416. 2417. 2418. 2419. 2420. 2421. 2422. 2423. 2424. 2425. 2426. 2427. 2428. 2429. 2430. 2431. 2432. 2433. 2434. 2435. 2436. 2437. 2438. 2439. 2440. 2441. 2442. 2443. 2444. 2445. 2446. 2447. 2448. 2449. 2450. 2451. 2452. 2453. 2454. 2455. 2456. 2457. 2458. 2459. 2460. 2461. 2462. 2463. 2464. 2465. 2466. 2467. 2468. 2469. 2470. 2471. 2472. 2473. 2474. 2475. 2476. 2477. 2478. 2479. 2480. 2481. 2482. 2483. 2484. 2485. 2486. 2487. 2488. 2489. 2490. 2491. 2492. 2493. 2494. 2495. 2496. 2497. 2498. 2499. 2500. 2501. 2502. 2503. 2504. 2505. 2506. 2507. 2508. 2509. 2510. 2511. 2512. 2513. 2514. 2515. 2516. 2517. 2518. 2519. 2520. 2521. 2522. 2523. 2524. 2525. 2526. 2527. 2528. 2529. 2530. 2531. 2532. 2533. 2534. 2535. 2536. 2537. 2538. 2539. 2540. 2541. 2542. 2543. 2544. 2545. 2546. 2547. 2548. 2549. 2550. 2551. 2552. 2553. 2554. 2555. 2556. 2557. 2558. 2559. 2560. 2561. 2562. 2563. 2564. 2565. 2566. 2567. 2568. 2569. 2570. 2571. 2572. 2573. 2574. 2575. 2576. 2577. 2578. 2579. 2580. 2581.

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CONTROL RECONNAISSANCE ON THE ELDERADO NATIONAL FOREST,

In association CALIFORNIA, 1930

By

D. H. Miller,
Junior forester

PURPOSE

spotted distribution, being as found in belts or areas.

The performance of control reconnaissance on the Eldorado National Forest during 1930 was a continuation of the original purpose of the project, to secure a systematic survey of the commercial sugar pine belt of California in order to determine the sizes and sugar pine conditions existing therein and their relation to the spread of the white pine blister rust. This survey provides a basis upon which approximate costs can be computed for protecting sugar pine areas against blister rust.

LOCATION OF THE WORK

A. Reason for Selection

The Eldorado National Forest was selected because of the advisability of conducting reconnaissance in the gap between the Plumas National Forest on the north and the Stanislaus National Forest on the south on which areas work had already been done. The Eldorado supports good stands of sugar pine in its optimum range. The small amount of sugar pine on the Tahoe Forest immediately north of the Eldorado eliminated this forest from present consideration.

B. General Description

The Eldorado National Forest lies on the west slope of the Sierra Nevada south and west of Lake Tahoe between townships 7 and 14 north and ranges 10 and 19 east, Mt. Diablo Base Line Meridian. Many streams traverse the forest from east to west dividing it into a series of canyons and ridges. Beginning at the southern end and progressing north, the principal ones are: the Middle and South Forks of the Cosumnes River, the Silver and South Forks of the American River, Silver Creek, the Little South Fork of the Rubicon, the Rubicon, Long and Wallace canyons, and at the extreme northern end of the forest, the Middle Fork of the American River. The high ridges separating these rivers have thus far prevented the establishment of a complete north and south road system, so that the use of a pack train was required to gain access to some sections.

Placerville, the headquarters of the forest which is situated at its western boundary, was the temporary headquarters of and the base of supplies for the reconnaissance camp.

There is good reproduction throughout. Parts of the forest

CONTROL RECONNAISSANCE OF THE MIDORGE NATIONAL FOREST
October 1, 1933

by
 H. E. Miller,
 Forest Ranger
FOREST

The purpose of control reconnaissance on the Midorge National Forest during 1933 was a continuation of the original purpose of the project, to secure a systematic survey of the commercial timber pine belt of California in order to determine the size and value of the conditions existing therein and their relation to the growth of the white pine timber belt. This survey provides a basis upon which appropriate data can be compiled for protecting sugar pine areas against timber loss.

LOCATION OF THE WORK

1. Reason for Selection

The Midorge National Forest was selected because of the advisability of continuing reconnaissance in the gap between the Plumas National Forest on the north and the Stanislaus National Forest on the south on which there was no regular forest ranger. The Midorge occupies good stands of sugar pine in the optimum range. The small amount of sugar pine on the Tahoe Forest immediately north of the Midorge eliminated the need for separate consideration.

2. General Description

The Midorge National Forest lies on the west slope of the Sierra Nevada south and west of Lake Tahoe between townships 7 and 14 north and ranges 10 and 12 east. McCulloch Lake National Forest, which traverses the forest from east to west dividing it into a series of canyons and ridges. Beginning at the western end and proceeding north, the principal ones are: The Middle and South Forks of the Carson River, the River and lower forks of the American River, Silver Creek, the Middle Fork of the American, the American, Long and Wallace canyons, and at the extreme northern end of the forest, the Middle Fork of the American River. The high ridges separating these rivers have been the prevented the establishment of a complete north and south road system, so that the use of a pack trail was required to gain access to some sections.

Presently, the headquarters of the forest which is situated at its western boundary, and has temporary headquarters of and the base of supplies for the reconnaissance camp.

The sugar pine stands are found at elevations of 4,000 to 6,500 feet. In association with sugar pine occur the other timber species of the region, namely: western yellow pine (Pinus ponderosa), Jeffrey pine (P. jeffreyi), white fir (Abies concolor), red fir (A. magnifica), Douglas fir (Pseudotsuga taxifolia) and incense cedar (Libocedrus decurrens). Sugar pine is not evenly distributed within the forest, but exhibits a spotted distribution, being usually found in belts or zones. Its volume per acre is represented to a great extent by one or two large, well developed trees, which condition further emphasizes the scattered nature of the pine of this region. A moderate amount of reproduction is present.

Four species of Ribes are native to the sugar pine stands. In the order of their abundance they are: Ribes roezli, R. nevadense, R. viscosissimum and R. cereum. R. nevadense inhabits stream bottoms and moist sites, while R. roezli is found on all sites. R. viscosissimum occurs on the higher ridges, and R. cereum on the dry sites bordering lodgepole pine flats and within yellow pine types; neither of these species is abundant.

As a general rule, heavy brush characterizes the areas worked. The principal genera are Arctostaphylos, Ceanothus, Cornus, Prunus, Quercus, Acer, Alnus and Salix.

C. Detailed Location

There are four major areas within the forest supporting the best sugar pine stands, and on which reconnaissance was conducted. Brief descriptions of these follow:

1. The North Fork of the Cosumnes River and Cat Creek division on the southern edge of the forest consists of two adjoining valleys including about 28 sections. The Cat Creek portion supports an excellent stand of mature sugar pine, while the northern part of the unit supports only a scattered and mediocre stand. A large part of the land is owned by the California Door Company.

2. The Alder Creek, Silver Fork and American River division lying north of the first and consisting of some 70 sections, has belts of good sugar pine throughout, excepting the north side of the American River canyon. The Silver Fork portion contains excellent sugar pine accessible at present by pack train only. The California Door Company is the largest timber owner.

3. Between the South Fork of the American River and the Rubicon River lies the Ice House and Silver Creek unit which has the largest and best stands of sugar pine found on the forest. Excellent mature pine forming from 60 per cent to 80 per cent of the stand is found on several entire sections. There is good reproduction throughout. Parts of the area are

rough, but as a whole it is less rugged than the other units, and is traversed by several roads. The 68 sections embracing the area are largely in the ownership of the Michigan California Lumber Company, as field supervisor.

4. The Rubicon unit, a series of deep canyons on the northern border of the forest between the Rubicon River and the Middle Fork of the American River, is the smallest and poorest unit worked. Pack trains were used here exclusively since roads are non-existent. Small patches and belts of sugar pine are intermingled with large brush fields. Small owners control the larger part of the timber.

National Forest follow. Since there were no wide differences in the methods of work, the methods of work is given in Table III, Forest. Instead, a summary for all

A. Mechanical Procedure

The mechanical methods of reconnaissance were the same as those employed during the previous three seasons, which are fully described in the Blister Rust Report for 1927. However, a few changes were made. First, Ribes data were taken in all large draws and dry stream beds, as well as along the streams themselves. Second, a minimum width of one-half chain for stream type on each side of the stream was adopted in order that the acreage of this type shown by reconnaissance data might more nearly conform to that obtained on actual eradication operations. Third, more emphasis was laid on the Ribes count on the plots in an effort to obtain a figure more representative of the true Ribes population. Fourth, the timber species were listed in the column headed "Over-story" on the data sheets in the order of their predominance by volume in the locality of each timber plot. This was done at the suggestion of the Forest Service of Region 5, the data to be used by them in the preparation of a timber type map. Fifth, when beginning a strip, the first Ribes plot was started at a distance of one chain from the section line and extending four chains in the direction of the strip instead of starting five chains from the section line. This was done to avoid the possibility of the last plot on the strip extending into the next section in case of error in pacing.

B. Eradication Types

The composition of the forest varied so frequently and so gradually that at times it was very difficult to classify a stand according to eradication types. The standard eradication types are: sugar pine-yellow pine usually occurring in mature stands (SP-YF mat.), sugar pine-fir in mixed age classes (SP-F mix), stream type (stream) cut-over types for the same (SP-YF CO, SP-F CO, Stream CO), brush, meadow and minor types. Minor types include all the various non-sugar pine timber types not included in the above, such as pure yellow pine, yellow pine in association with other species, and numerous fir types. These were mapped separately upon the field sheets to aid the Forest Service with their type map, but were consolidated under "minor types" when the office computations were made.

...and as a whole it is less rugged than the other units, and is
 traversed by several rivers. The vegetation is mostly
 largely to the ownership of the Michigan California Lumber Company.

4. The timber belt, a series of low canyons on the northern border
 of the forest between the Michigan River and the Michigan belt of the
 American River, is the widest and poorest unit. Some timber
 were used here extensively since roads are not numerous. Small patches
 and belts of higher pine are interspersed with large areas of deciduous
 owners control the larger part of the timber.

WITHOUT OF THE

1. Mechanical Processes

The mechanical methods of timber harvesting were the same as
 those employed during the previous three seasons, which are briefly
 noted in the Forest Report for 1927. However, a few changes were
 made. First, timber data were taken in all large tracts and the same data
 as well as along the stream themselves. Second, a minimum width of
 one-half chain for stream flow on each side of the stream was adopted in
 order that the average of the flow shown by cross-sections made at right
 more nearly conform to that obtained on actual sectioning operations.
 Third, more emphasis was laid on the flow measurement of the large tracts
 effort to obtain a flow more representative of the true stream
 flow. The timber statistics were listed in the column headed "over-logging"
 on the data sheets in the order of their remoteness by volume to the
 locality of each timber tract. This was done at the suggestion of the
 Forest Service of Region 5, the data to be used by them in the preparation
 of a timber type map. Third, when beginning a strip, the first timber
 plot was started at a distance of one chain from the section line and
 extending four chains in the direction of the strip instead of extending
 five chains from the section line. This was done to avoid the possibility
 of the last plot on the strip extending into the next section in case of
 error in plotting.

2. Classification Types

The composition of the forest varied so frequently and so
 greatly that it was very difficult to classify it into a small number
 of standard classification types. The standard classification types are:
 sugar pine-yellow pine usually occurring in mixed stands (M-Y),
 sugar pine-fir in mixed stands (S-F), spruce type (S),
 redwood type (R), fir type (F), spruce type (S),
 and other types. Many types include all the various pine-yellow pine
 timber types not included in the above, such as pure yellow pine, yellow
 pine in association with other species, and numerous fir types. These
 were grouped separately from the first three to aid the forest service
 with their type map, but were consolidated under "other types" when the
 office computations were made.

C. Personnel

The field supervisor, D. E. Miller, six assistants and a cook, composed the field personnel of the project. Compilations of data were made by W. V. Benedict and T. H. Harris, map work by P. R. Staat.

WORK PERFORMED AND RESULTS OBTAINED

Tables giving the results of reconnaissance on the Eldorado National Forest follow. Ribes analysis by localities was abandoned since there were no wide differences in data between sections of the forest. Instead, a summary for all areas covered is given in Table No. 2.

TABLE NO. 1

SECTIONS WORKED IN WHOLE OR IN PART.
RECONNAISSANCE, ELDORADO NATIONAL FOREST, CALIFORNIA, 1930

| T. | R. | Sections by Number | Totals | |
|--------|-----|---|--------|---------|
| | | | Sec. | Acres |
| 8N | 15E | 3 | 1 | 640 |
| 9N | 14E | 1-5, 11, 12, 14, 15, 24 | 10 | 6,400 |
| 9N | 15E | 7, 8, 10, 15, 23, 27-29, 32-35 | 19 | 12,160 |
| 10E | 10E | 6 | 1 | 1,280 |
| 10E | 15E | 1, 5-9, 12, 15-29 | 22 | 13,462 |
| 10N | 16E | 3-5, 7-9, 15-22, 27-30, 32-34 | 20 | 14,364 |
| 11N | 14E | 1, 3-5, 7-10, 12-17 | 14 | 8,000 |
| 11N | 15E | 20-23, 26-29, 31-34 | 12 | 7,128 |
| 11N | 16E | 19-30 | 12 | 7,680 |
| 12E | 13E | 1, 11-16, 20-28, 35 | 17 | 10,560 |
| 12E | 14E | 5-10, 13, 16-21, 23-25, 29, 30, 32, 33 | 20 | 11,200 |
| 12E | 15E | 17, 19, 20, 30 | 4 | 2,560 |
| 13E | 13E | 1, 2, 4, 10, 11, 14-23, 25, 27-31, 30, 36 | 23 | 12,208 |
| 13E | 14E | 10, 11, 13, 14, 21-24, 27-32 | 14 | 8,000 |
| 14E | 13E | 13, 14, 22-28, 34 | 10 | 6,400 |
| 14E | 14E | 18 | 1 | 640 |
| Totals | | | 200 | 122,882 |

TABLE No. 2

ACREAGE AND RIBS ANALYSIS OF AREA RECONNAISSANCE HEDYAKO NATIONAL FOREST

| Classification Types | Acres | Per Cent of Total | Ribs per Acre | | | | Per Cent of Total |
|----------------------|---------|-------------------|---------------|-------------------|-----------|--------|-------------------|
| | | | R. new-dease | R. viscontissimus | R. cereus | Totals | |
| W-12 Laure | 27,483 | 8.8 | 34.1 | 1.7 | 0.02 | 35.9 | 11.1 |
| W-12 Fir Alzel | 44,878 | 36.2 | 126.8 | 11.5 | 4.1 | 142.6 | 43.9 |
| W-12 CO | 380 | 0.3 | 5.4 | - | - | 5.4 | 0.02 |
| W-12 CO | 283 | 0.2 | 12.4 | - | - | 12.4 | 0.03 |
| Totals | 82,553 | 67.3 | 83.9 | 6.9 | 2.2 | 93.9 | 28.4 |
| W-12 Stream | 5,095 | 4.4 | 118.4 | 95.6 | 2.7 | 217.6 | 6.9 |
| W-12 Brush | 6,477 | 5.6 | 79.6 | 2.7 | - | 82.9 | 2.2 |
| W-12 Meadow | 347 | 0.3 | 23.6 | - | - | 23.6 | 0.1 |
| W-12 Minor Types | 26,006 | 21.6 | 70.0 | 2.5 | 5.4 | 77.9 | 23.4 |
| Totals | 34,730 | 28.8 | 19.7 | 17.1 | 4.7 | 41.6 | 11.6 |
| Grand Totals | 122,683 | 100.0 | 31.9 | 9.3 | 2.6 | 43.8 | 100.0 |

Percentage of total Ribs on the whole area covered.

1. The first part of the paper is devoted to a general discussion of the problem of the existence of a solution of the system of equations (1) for arbitrary values of the parameters α and β . It is shown that the system of equations (1) has a solution for arbitrary values of the parameters α and β if and only if the condition $\alpha + \beta = 1$ is satisfied. This condition is also necessary for the existence of a solution of the system of equations (1) for arbitrary values of the parameters α and β .

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STATEMENT AND ANALYSIS OF COSTS

TABLE NO. 3

CONTROL RECONNAISSANCE COSTS ELDERADO NATIONAL FOREST, CALIFORNIA, 1930

Further laboratory and field experiments have been conducted by the Billing Service of various types of reconnaissance work done as in previous years at the control, experimental and other points.

| Classification | Cost | Percentage of Total |
|----------------------------------|-------------------|---------------------|
| Supervision and Labor | | |
| Supervision, salary and expenses | \$ 869.07 | 22.5 |
| Salaries of assistants | 1,726.66 | 43.6 |
| Totals | 2,615.73 | 66.1 |
| Subsistence* | | |
| Cost of food | 519.48 | 13.1 |
| Transportation of food | 80.00 | 2.0 |
| Cook's salary | 270.00 | 6.8 |
| Totals | 869.48 | 21.9 |
| Transportation | | |
| Transportation of men | 88.29 | 2.2 |
| Miscellaneous travel | 46.07 | 1.2 |
| Scouting | 107.04 | 2.7 |
| Totals | 241.40 | 6.1 |
| Equipment | | |
| Cost of equipment | 73.61 | 1.9 |
| Transportation of equipment** | 13.19 | 0.3 |
| Storage of equipment | 13.73 | 0.3 |
| Totals | 216.53 | 5.5 |
| Miscellaneous expenses | 13.85 | 0.4 |
| Grand Total (by means) | \$3,956.07 | 100.0 |

*Number of meals served. 2,162

Cost per meal. \$.404

**Includes \$72.00 pack train hire.

The cost per acre was \$.0322 obtained by dividing the total cost of reconnaissance by the number of acres covered.

PART I

INVESTIGATIVE WORK IN THE CHEMICAL ERADICATION OF RIBES

By

H. R. Offord

Agent

INTRODUCTION

Further laboratory and field experiments have been undertaken to determine the killing action of various chemicals on Ribes. Laboratory work has been done as in previous years at the University of California and has comprised chemical, morphological and physiological experiments, primarily on Ribes petiolare, R. inerme, R. viscosissimum and R. lacustre. These laboratory investigations have been used as the basis for additional field experimentation conducted during the 1930 field season. In Idaho, R. petiolare, R. inerme, R. viscosissimum and R. lacustre were subjected to additional experimentation and in California, R. inerme, R. roezli and R. nevadense were further studied. The work in Oregon included additional experiments on R. bracteosum, R. lacustre, R. watsoneanum and R. sanguineum. Experiments were made this year for the first time on R. hallii and R. erythrocarpum in the Crater Lake region.

A brief summary of research work conducted at Berkeley during the period September 1929 to May 1930 is given in this report primarily as an introduction to field experiments. For complete information on the various chemical and morphological investigations reference should be made to special reports and papers prepared for office reference or for publication.

Field experiments reported herein for 1930 include applications of chemicals to aerial parts, (1) as an aqueous spray, (2) dissolved in or added to an oil; to stems, (1) as an aqueous solution applied to a scarified surface, (2) in the form of a paste packed into incision; and to crowns, (1) as an aqueous solution applied to a scarified surface, (2) as an aqueous solution injected into holes bored by means of a twist drill, and (3) as a water paste packed into V-shaped grooves.

A consideration of all research work performed to date and a review of field experiments carried out at the suggestion of that research work showed the advisability of investigating methods of chemical treatment other than the established spraying method. Experiments were planned therefore to consider possible penetration of chemicals through roots, through crowns and through aerial stems.

SUMMARY OF RESEARCH WORK 1929 - 1930

A. Propagation of Ribes Under Greenhouse Conditions

A satisfactory technique has been worked out for growing *Ribes* in sand culture and water culture. For the former method a light sandy soil containing a high percentage of leaf mold or peat is used. The water culture method, however, is more convenient for rapid propagation of experimental material provided that it is not necessary to hold plants in this medium for too long a period. This method has been used almost exclusively during the past year. Quarter strength Hoagland culture solution is used for *R. petiolare*, half strength Hoagland for *R. inerme* and *R. lacustre*, and full strength Hoagland for *R. roezli* and *R. viscosissimum*. Full strength Hoagland solution has the following composition in parts per million:

NO₃ - 715, PO₄-105, SO₄-214, K-184, Ca-159, Mg-54.

Small quantities of boron, manganese, copper, zinc, etc., so-called A to Z solution, are added to the solution. About 5 c.c. ferric tartrate solution is added weekly to each 3-liter jar. The jars are wrapped in paper to exclude light and then placed in damp sphagnum moss to maintain the temperature of the culture solution at 16 degrees centigrade. Culture solutions are aerated twice a week to prevent accumulation of gases caused by decomposition of organic material. Artificial illumination is used during the short dark days. Solutions are replaced by freshly prepared ones every thirty days.

B. Chemical Work

The following investigations were undertaken during the period September, 1929 to May, 1930:

1. Starch analysis of leaves, stems and roots of *R. petiolare*, *R. inerme*, *R. lacustre* and *R. viscosissimum*. Results of 120 determinations confirm earlier field observations made by Crafts that *R. petiolare* maintains a lower starch reserve throughout the entire growing season than do the more resistant species. This work will be the subject of a special report giving results in detail.

Starch determination of other *Ribes* are planned for the year according to the working plan given at the conclusion of this report.

2. The reaction of starch-sodium chlorate mixtures under the influence of ultra violet light. Exposure of acid and neutral solutions of sodium chlorate in quartz tubes to ultra violet light resulted in a decomposition of the sodium chlorate as evidenced by the subsequent oxidation of KI. Vitellæ cells immersed in .01 M. sodium chlorate solutions were

Winter of 1950-51.

5. The effect of water stress on root system. In the first series of experiments, the effect of water stress on the root system was studied. The results are given in Table 1.

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2. The following information is being furnished to you for your information:

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4. The study of the toxic action of dilute sodium chlorate solution on Nitella. The importance of pH on the toxic action of buffered solutions of sodium chlorate on *Nitella* was studied in a series of critical experiments. A comparison was also made between sodium chlorate and sodium nitrate as a basis for establishing the fundamental toxicity of the chlorate. Results of these experiments showed the increased effectiveness of sodium chlorate in slightly acid solutions and further confirmed the toxicity of the chlorate ion. Results of these experiments are now being prepared for publication.

5. Complex salts of heavy metals. On the basis of non-reactivity with plant extractives typical complex compounds were prepared of the following classes of chemical compounds:

a. Non-electrolytes

b. Electrolytes (binary, ternary and quaternary)

Aqueous sprays of complex salts of heavy metals have not proved to be fully effective on the resistant Ribes and later work has centered about a heavy metal complex soluble in oil but preferentially soluble in water. However, the extreme rapidity with which complex salts move through the vessel elements has suggested that injection may be a more fruitful field for their use than contact sprays. These two lines of investigation will be pursued further in subsequent research work.

6. Complex compounds of selenium, chromium, copper and cobalt were tested as sprays in aqueous solution. Various oils, notably pitch oil and emulsions of these oils containing chlorate, sodium selenate, copper complex, etc., were also tested by spray application to greenhouse Ribes. In addition to these sprays, zinc, ammonium chloride and sodium chlorate containing varying small percentages of osmic acid were given similar tests. A series of hygroscopic dusts prepared by mixing copper complex with magnesium chloride and calcium chloride to which gypsum and Amolin had been added as a dilutant were also tested in the greenhouse. Those which showed possibility for field use are described later in this report under field experiments.

C. Morphological Work.

A detailed report covering morphological work undertaken during the past 18 months has been prepared by Dr. Leiber. A summary is herein presented of the morphological data most significant in regard to susceptibility of Ribes to chemical treatment.

are now being prepared for publication.

confirmed the toxicity of the chlorate ion. Results of these experiments

effectiveness of sodium chlorate in inhibiting soil fungi. First the

the chlorate. Results of these experiments showed the increased

and/or where as a means for controlling the fundamental toxicity of

experiments. A summary of the soil-fungus action chlorate has

of sodium chlorate on fungi has resulted in a number of distinct

regarding the importance of sodium chlorate in soil fungicide studies.

the study of the toxicity of sodium chlorate to soil fungi.

A number series of tests were made. On the basis of non-reactivity with extraneous physical agents, samples were selected from the following classes of chemical compounds:

89971.7 305-100.1

Dr. George W. Brown, Secretary, University of California, Berkeley, California

be viewed further in connection with the above.

6. Complex compounds of selenium, tellurium, and bismuth.

which showed promising for their use as chemical reagents in the synthesis of new drugs. The results of the experiments are given in the following table.

... isolation ...

A detailed report covering morphological and histological changes in the testis was submitted by Dr. Roberts. A summary of results presented at the symposium have been published in reports in the proceedings of the symposium.

1. He base production:

- a. Leaf size. R. petiolare, R. viscosissimum, R. inerme,
R. lacustre, arranged in decreasing order.
- b. Length and basal diameter of current season's shoots.
R. petiolare, R. viscosissimum, R. inerme, R. lacustre,
arranged in decreasing order.

2. Epidermal characters:

- a. Stomatal number. R. petiolare, R. viscosissimum, R. inerme,
R. lacustre, arranged in decreasing order.
- b. Hydathode number per leaf tooth. R. petiolare and R. visco-
gissimum 2 - 5 and R. inerme and R. lacustre 1 - 3
hydathodes per leaf tooth. R. petiolare has also the
greatest number of teeth per leaf blade.

3. Palisade Ratio:

- R. petiolare, R. viscosissimum, R. inerme and R. lacustre
arranged in decreasing order.

4. Size of leaf blade vascular bundle:

- R. petiolare, R. viscosissimum, R. inerme and R. lacustre
arranged in decreasing order.

5. Thickness of upper and lower epidermal cells.

- R. petiolare and R. viscosissimum usually have thinner outer
walls than R. inerme and R. lacustre.

6. Texture, size and number per unit area of xylem elements in
old stems. R. petiolare, R. viscosissimum, R. inerme,
R. lacustre arranged in decreasing order in regard to
potential conduction in light of these factors.

Examination of the above series of morphological data shows
that the four Ribes species in all cases fall into the same order with
respect to one another. This order arranges the Ribes in the previously
determined order of susceptibility to chemicals. It might be noted that
the morphological data show R. lacustre to be slightly more resistant
to chemicals than R. inerme if the end position in this scale is
considered for the moment to be significant. R. lacustre is similarly
placed at the most resistant end of the list by chemical data, though
in field experiments R. inerme has appeared to be most resistant.

1. General description

1.1. General description
The material is a collection of various objects, including a small box, a piece of paper, and a small bottle.

1.2. Description of the objects
The objects are arranged in a row on a table. The first object is a small box, the second is a piece of paper, and the third is a small bottle.

2. Detailed description

2.1. Description of the box
The box is made of wood and is painted white. It is rectangular and has a lid. The lid is slightly raised.

2.2. Description of the paper
The paper is a single sheet of white paper. It is rectangular and has a slightly wavy edge.

2.3. Description of the bottle
The bottle is made of glass and is painted white. It is cylindrical and has a narrow neck. The neck is slightly tapered.

3. Conclusions

3.1. Conclusions
The objects are arranged in a row on a table. The first object is a small box, the second is a piece of paper, and the third is a small bottle.

3.2. Conclusions
The objects are arranged in a row on a table. The first object is a small box, the second is a piece of paper, and the third is a small bottle.

3.3. Conclusions
The objects are arranged in a row on a table. The first object is a small box, the second is a piece of paper, and the third is a small bottle.

3.4. Conclusions
The objects are arranged in a row on a table. The first object is a small box, the second is a piece of paper, and the third is a small bottle.

3.5. Conclusions
The objects are arranged in a row on a table. The first object is a small box, the second is a piece of paper, and the third is a small bottle.

R. lacustre and R. inerte, however, are close together in this scale of susceptibility. The most significant division comes between R. patibulare and R. viscosissimum on the one hand and between R. inerte and R. lacustre on the other. This division is corroborated by chemical and morphological data and also by the results of field experiment.

| | | | | | | | |
|-------|------|-----|-----|----|----|----|----|
| Y (2) | 3.51 | 6.5 | 5.0 | 57 | 42 | 54 | 18 |
| Y (3) | 3.54 | 5.5 | 3.0 | 57 | 48 | 54 | 18 |

D. Application of Research Work and Greenhouse Tests to Field Experiments.

Laboratory investigations and greenhouse tests undertaken at Berkeley suggested field experiments as follows:

| | | | | | | | |
|----------------------|------|-----|-----|----|----|----|----|
| • Magnesium chloride | 0.33 | 8.0 | 2.0 | 55 | 47 | 54 | 18 |
| A | 2.70 | | | | | | |

1. The use of buffered sodium chlorate and Atlacide sprays in place of sprays merely adjusted with dilute acid or alkali.

| | | | | | | | |
|----------------------|---|--|--|--|--|--|--|
| • Magnesium chloride | 0 | | | | | | |
|----------------------|---|--|--|--|--|--|--|

2. The use of copper complex as a crown or stem injection.

3. Pitch oil, Diesel oil and Edeleanu extract containing as a solute varying amounts of furfural, pyridene, benzene, toluene and naphthalene.

| | | | | | | | |
|-------------|------|-----|-----|--|--|--|--|
| • Magnesium | 2.70 | 6.5 | 5.0 | | | | |
| X | 3.40 | 5.5 | 5.0 | | | | |

4. The use of zinc ammonium chloride as a crown application to Bercaris vulgaris and R. inerte.

SUMMARY OF 1930 FIELD EXPERIMENTS

A. Recheck of 1929 Experiments in Idaho, California and Oregon.

Experimental plots at Banta, Idaho were checked by A. Bickford and subsequently by the writer according to the established method of ocular estimates. Table 1 summarizes these data. Plots at Gooseberry Camp and Island Meadow, California, were checked by d'Urbel and Quick; results are reported in Table 2. Oregon work for 1929, checked by d'Urbel, Holaday and the writer in July and August of 1930, is reported in Tables 3 and 4.

| | | | | | | | |
|----------------------|------|------|-----|--|--|--|--|
| • Chlorate | 2.70 | 5.0 | | | | | |
| • Magnesium chlorate | 3.40 | 14.0 | | | | | |
| X | 1.40 | 5.0 | | | | | |
| • Magnesium chlorate | 1.40 | 5.0 | | | | | |
| X | 2.70 | 14.0 | 5.0 | | | | |
| • Magnesium chlorate | 3.40 | 14.0 | 5.0 | | | | |
| X | 3.40 | 14.0 | 5.0 | | | | |

• Chlorate

Complex series made in field (Cu 1 : SnO_2 5 : CH_3CO 4).

Complex series made in field (Cu 1 : SnO_2 5 : CH_3CO 4).

Complex series made from quantities made in greenhouse by R. B. Bickford

Complex series made from quantities made in greenhouse by R. B. Bickford

1. Insects and A. ... however, are also ... in this ... of ... the most ... division ... and ... and ... on the one ... and ... in the ... This ... is ... by ... and ... of their ...

2. Insects of ... and ...

... laboratory ... and ... as follows:

1. The use of ... and ...
2. The use of ...
3. ...
4. The use of ...

Summary of ...

1. ...

... reported ... of ... and ...

... of ... and ...

TABLE NO. 1

RESULTS OF 1929 EXPERIMENTAL SPRAYING AT SANTA, ILLINO. DATA TAKEN IN 1930.

| Date of Application | Plot Number | Chemical | Concentration Pounds Per Gallon H ₂ O | pH of Spray | Gallons Spray Used | At Time of Application | | Weather Log | R. Insects | | |
|---------------------|----------------|------------------------|--|-------------|--------------------|---|---|---------------|---------------------------|------------------------|-----------------------|
| | | | | | | Average Soil Temp. 7:30 a.m. to 5 p.m. Degrees F. | Average Relative Humidity 7:30 a.m. to 5 p.m. | | Live Stem Killed Per Cent | Bushes Killed Per Cent | Bushes Treated Number |
| 7/2/29 | XI A (0-1) | A (1) | 2.70 | 6.5 | 2.0 | 55 | 37 | Warm. Clear. | 74 | 14 | 35 |
| | | + Magnesium chloride | 1.50 | | | | | | | | |
| 7/8/29 | XI A (1-1.6) | A | 2.70 | 8.0 | 2.0 | 56 | 59 | Warm. Clear. | 85 | 0 | 9 |
| | | + Magnesium chloride | 1.50 | | | | | | | | |
| 7/8/29 | XI A (1.6-2) | A | 2.70 | 4.0 | 2.0 | 56 | 59 | Warm. Clear. | 97 | 40 | 10 |
| | | + Magnesium chloride | 1.50 | | | | | | | | |
| 7/8/29 | XI A (2-2.5) | A | 2.70 | 8.0 | 3.5 | 56 | 59 | Warm. Clear. | 93 | 50 | 18 |
| | | + Magnesium chloride | 0.75 | | | | | | | | |
| 7/9/29 | XI B (1-2.2) | Y (2) | 3.54 | 6.5 | 5.0 | 57 | 48 | Warm. Clear. | 74 | 3 | 34 |
| 7/9/29 | XI B (2.2-3) | Y (3) | 3.54 | 6.5 | 5.0 | 57 | 48 | Warm. Clear. | 64 | 18 | 22 |
| 7/10/29 | XI A (2.5-3) | A | 2.70 | 4.0 | 6.0 | 60 | 44 | Warm. Clear. | 90 | 44 | 41 |
| | | + Magnesium chloride | 0.75 | | | | | | | | |
| 7/10/29 | XI A (3-3.6) | A | 2.70 | 6.5 | 3.0 | 60 | 44 | Warm. Clear. | 92 | 33 | 9 |
| | | + Magnesium chloride | 0.75 | | | | | | | | |
| 7/11/29 | XI A (3.6-4) | A | 2.70 | 8.0 | 3.0 | 57 | 48 | Warm. Cloudy. | 93 | 31 | 16 |
| | | + Magnesium chloride | 0.33 | | | | | | | | |
| 7/11/29 | XI B (3-3.5) | A | 2.70 | 6.5 | 2.0 | 57 | 48 | | 100 | 100 | 5 |
| | | + Magnesium chloride | 0.33 | | | | | | | | |
| 7/11/29 | XI B (3.5-4) | A | 2.70 | 4.0 | 4.0 | 57 | 48 | Warm. Cloudy. | 96 | 77 | 13 |
| | | + Magnesium chloride | 0.33 | | | | | | | | |
| 7/12/29 | XI B (0-1) | A | 2.70 | 8.0 | 2.0 | 55 | 43 | Warm. Cloudy. | 90 | 25 | 8 |
| | | + Magnesium chloride | 0.13 | | | | | | | | |
| 7/12/29 | XI A (4-4.5) | A | 2.70 | 4.0 | 3.0 | 55 | 43 | Warm. Cloudy. | 96 | 65 | 20 |
| | | + Magnesium chloride | 0.13 | | | | | | | | |
| 7/12/29 | XI A (4.5-5) | A | 2.70 | 6.5 | 4.0 | 55 | 43 | Warm. Cloudy. | 95 | 67 | 9 |
| | | + Magnesium chloride | 0.13 | | | | | | | | |
| 7/13/29 | XI A (5-5.5) | Y (2) | 2.88 | 6.5 | 5.0 | 59 | 38 | Warm. Clear. | 86 | 24 | 25 |
| | | + Magnesium chloride | 0.13 | | | | | | | | |
| 7/15/29 | XI B (4-4.4) | Y (2) | 3.54 | 6.5 | 5.0 | | | | 75 | 35 | 20 |
| | | + Glue + Glycerine | | | | | | | | | |
| 7/17/29 | XI B (4.4-5) | X (4) | 1.40 | 6.5 | 5.0 | 66 | 30 | Hot. Clear. | 75 | 19 | 26 |
| | | + Molasses | | | | | | | | | |
| 7/17/29 | XI B (5-6) | X | 2.00 | 6.5 | 5.0 | 66 | 30 | Hot. Clear. | 62 | 3 | 30 |
| | | + Molasses | | | | | | | | | |
| 7/18/29 | X B (0-.4) | X | 2.70 | 6.5 | 5.0 | 65 | 39 | Hot. Clear. | 73 | 33 | 12 |
| | | + Molasses | | | | | | | | | |
| 7/18/29 | X B (.4-1) | X | 3.40 | 6.5 | 5.0 | 65 | 39 | Hot. Clear. | 79 | 12 | 24 |
| | | + Molasses | | | | | | | | | |
| 7/22/29 | X B (1-1.5) | X | 2.70 | 6.5 | 5.0 | 59 | 34 | Warm. Clear. | 62 | 19 | 21 |
| | | + Glue | | | | | | | | | |
| 7/23/29 | Ex. 1 | X | 2.70 | 6.5 | 5.0 | 65 | 27 | Warm. Clear. | 50 | 0 | 10 |
| | | + Molasses | | | | | | | | | |
| 7/23/29 | Ex. 2 | X | 2.70 | 6.5 | 5.0 | 56 | 24 | Warm. Clear. | 60 | 0 | 10 |
| | | + Glycerine | | | | | | | | | |
| 7/23/29 | XII A (0-.05) | X | 2.70 | 6.5 | 5.0 | 60 | 35 | Warm. Clear. | | | |
| | | + Molasses | | | | | | | | | |
| 7/25/29 | XII A (.05-.1) | X | 2.70 | 6.5 | 5.0 | | | Warm. Clear. | 65 | 12 | 8 |
| | | + Molasses | | | | | | | | | |
| 7/26/29 | XII A (1-.2) | X | 0.42 | | | | | Warm. Clear. | 72 | 15 | 13 |
| | | + Sodium thiosulphate | 4.12 | | 5.0 | | | | | | |
| 7/26/29 | XII A (.2-.3) | X | 0.33 | | | | | Warm. Clear. | 46 | 0 | 10 |
| | | + Sodium thiosulphate | 4.12 | | | | | | | | |
| 8/8/29 | X B (1.5-2) | X | 2.00 | | 5.0 | 59 | 56 | Warm. Clear. | 64 | 8 | 13 |
| | | + Sodium thiosulphate | 2.06 | | | | | | | | |
| 8/8/29 | Ex. 3 | Sodium thiosulphate | 4.12 | | 4.0 | 59 | 30 | Warm. Clear. | 25 | | See text |
| 8/3/29 | Ex. 4 | Sodium thiosulphate | 3.09 | | 5.0 | 58 | 26 | Warm. Clear. | 25 | | " " |
| 8/3/29 | Ex. 5 | Sodium thiosulphate | 2.06 | | 4.0 | 58 | 26 | Warm. Clear. | 15 | | " " |
| 8/24/29 | Ex. 6 | X | 0.89 | 8.0 | 6.0 | | | | 25 | | " " |
| | | + Glue (5) + Glycerine | | | | | | | | | |
| 8/24/29 | Ex. 7 | X | 1.40 | 8.0 | 5.0 | | | | 25 | | " " |
| | | + Glue + Glycerine | | | | | | | | | |
| 8/24/29 | Ex. 8 | X | 2.00 | 8.0 | 5.0 | | | | 70 | | " " |
| | | + Glue + Glycerine | | | | | | | | | |
| 8/24/29 | Ex. 9 | X | 2.70 | 8.0 | 5.0 | | | | 70 | | " " |
| | | + Glue + Glycerine | | | | | | | | | |
| 8/3/29 | Ex. 10 | Magnesium chloride | 3.40 | | 14.0 | | | | 70 | | " " |
| 8/3/29 | Ex. 11 | X | 1.40 | | 5.0 | | | | 30 | | " " |
| | | + Ammonium chloride | 0.50 | | | | | | | | |
| 8/3/29 | Ex. 12 | X | 1.40 | | 5.0 | | | | 40 | | " " |
| | | + Ammonium chloride | 0.20 | | | | | | | | |
| 8/3/29 | Ex. 13 | X | 2.70 | 10.0 | 5.0 | | | | 50 | | " " |
| | | + Magnesium chloride | 0.37 | | | | | | | | |
| 8/3/29 | Ex. 14 | X | 2.70 | 10.0 | 5.0 | | | | 40 | | " " |
| | | + Magnesium chloride | 0.13 | | | | | | | | |

(1) Sodium chlorate.

(2) New complex series made in field (Cu 1 : S₂O₃ 6 : CW 4).(3) New complex series made in field (Cu 1 : S₂O₃ 5 : CW 4).

(4) Standard complex : furnished from quantity made in Spokane by H. R. Offord.

(5) Glue .02% per gallon water and glycerine .1 to .5% per gallon as sticker and binder.



RESULTS OF 1929 EXPERIMENTAL SPRAYING IN CALIFORNIA, DATA TAKEN 1930.

- (1) Complex series made in field (Cu 1 : 52.03 g : Cu 2).
- (2) Complex series made in field (Cu 1 : 52.03 g : Cu 3).
- (3) Complex series made in field (Cu 1 : 52.03 g : Cu 4).
- (4) Sampled from lot made in Spokane, W. B. Offord.
- (5) Glycerine added as binder 0.1% per gallon water.
- (6) Vaseline added as a sticker 0.1% per gallon water.
- (7) Glue added as a sticker 0.02% per gallon water.
- (8) Symbol for sodium chlorate.



TABLE NO. 3
RESULTS OF 1929 EXPERIMENTAL SPRAYING IN OREGON
DATA TAKEN 1930

| Date of Appli-
cation | Plot Number | Chemical Used | Concen-
tration
Lbs. per
Gal. H ₂ O | pH of
Spray | Gal-
lons
Used | At Time of Application (1) | | Live Stem Killed
Per Cent | Bushes
Killed
Per
Cent | Bushes
Treated
Number |
|--------------------------|--------------------------|--------------------------------------|---|----------------|----------------------|--|------------------------------|------------------------------|---------------------------------|-----------------------------|
| | | | | | | Average
Relative
Humidity
7 a.m. to
5 p.m. | Weather Log (2) | | | |
| 7/29/29 | Still Creek
I A (0-1) | X (3)
+ Glycerine | 1.80 | 6.5 | 10 | 33 | Clear. Warm. | Still Creek (6a)
10 | 0 | 12 |
| 7/30/29 | I A (1-2) | X
+ Glycerine + Glue | 2.40 | 6.5 | 10 | 45 | Sultry. Cloudy. | 39 | 0 | 13 |
| 7/30/29 | I A (2-3) | X
+ Glycerine | 2.70 | 6.5 | 10 | 45 | | 20 | 0 | 16 |
| 7/30/29 | I A (3-4) | X
+ Magnesium chloride | 2.70
0.75 | 6.5 | 10 | 45 | | 13 | 0 | 29 |
| 7/31/29 | I B (2-3) | A (4)
+ Glue + Magnesium chloride | 1.40
1.50 | 6.5 | 10 | 54 | Sultry. Cloudy. | 88 | 4 | 46 |
| 8/1/29 | I B (3-4) | Y (5)
+ Glycerine + Glue | 2.16 | 6.5 | 10 | 80 | Foggy. | 12 | 0 | 27 |
| 8/2/29 | II A (0-1) | Y
+ Glycerine + Glue | 2.88 | 6.5 | 10 | 75 | Foggy in early
a.m. Clear | 33 | 0 | 37 |
| 8/2/29 | II A (1-2) | Y
+ Glycerine + Glue | 3.54 | 6.5 | 10 | 75 | in p.m. | 7 | 0 | 24 |
| 8/6/29 | Loop Highway
I A | X
+ Glycerine | 2.40 | 6.5 | 5 | 42 | Hot. Clear. | Loop Highway (6b)
20 | 0 | 9 |
| 8/6/29 | II | X
+ Glycerine | 2.70 | 6.5 | 5 | 42 | Hot. Clear. | 27 | 0 | 16 |
| 8/7/29 | I B | Y
+ Glycerine | 2.88 | 6.5 | 5 | 47 | Hot. Clear. | 30 | 0 | 7 |
| 8/7/29 | III | Y
+ Glycerine | 3.54 | 6.5 | 5 | 47 | Hot. Clear. | 34 | 0 | 18 |
| 8/8/29 | IV A | A | 1.40 | 6.8 | 5 | 37 | Hot. Clear. | 97 | 0 | 19 |
| 8/8/29 | IV B | A
+ Glycerine + Sodium hydroxide | 1.40
0.08 | | 5 | 37 | Hot. Clear. | 93 | 4 | 26 |
| 8/13/29 | Santiam River
I | Y
+ Glycerine | 2.88 | 6.5 | 5 | 23 | Hot. Clear. | Santiam River (6c)
21 | 0 | 21 |
| 8/13/29 | II | Y
+ Glycerine | 3.54 | 6.5 | 5 | 23 | Hot. Clear. | 63 | 0 | 8 |
| 8/13/29 | V | X
+ Glycerine | 2.40 | 6.5 | 5 | 23 | Hot. Clear. | 34 | 0 | 7 |
| 8/13/29 | VI | Y
+ Glycerine | 3.54 | | 5 | 23 | Hot. Clear. | 26 | 0 | 7 |
| 8/13/29 | III | A
+ Glycerine | 1.40 | 6.5 | 5 | 23 | Hot. Clear. | 91 | 21 | 10 |
| 8/13/29 | IV | A
+ Glycerine + Sodium hydroxide | 1.40
0.08 | | 5 | 23 | Hot. Clear. | 94 | 50 | 13 |
| 8/17/29 | Mud Creek
I | Y | 2.88 | | 5 | 34 | Clear. Warm. | Mud Creek (6d)
14 | 0 | 12 |
| 8/17/29 | II | X | 2.40 | 6.5 | 5 | 34 | Clear. Warm. | 12 | 0 | 30 |
| 8/17/29 | III | Y
+ Glycerine + Glue | 3.54 | 6.5 | 5 | 34 | Clear. Warm. | 8 | 0 | 66 |
| 8/17/29 | IV | X
+ Glycerine + Glue | 2.70 | 6.5 | 5 | 34 | Clear. Warm. | 6 | 0 | 47 |
| 8/17/29 | V | A
+ Glycerine + Glue | 1.40 | 6.5 | 5 | 34 | Clear. Warm. | 37 | 4 | 57 |
| 8/17/29 | VI | A
+ Sodium hydroxide | 1.40
0.08 | | 5 | 34 | Clear. Warm. | 52 | 16 | 28 |

(1) Soil temperatures were not taken.

(2) Weather characterized by high early morning humidity throughout course of Oregon work.

(3) Standard complex furnished from quantity made at Spokane by H. R. Offord.

(4) Sodium chlorate.

(5) New complex series made in field (Cu 1 : S₂O₃ 6 : CN 4).

(6) a. Still Creek (*R. bracteatum*). b. Loop Highway (*R. watsonianum*). c. Santiam River (*R. sanguineum*). d. Mud Creek (*R. triste*).

TABLE NO. 4

COMPLETION OF FIRST AND SECOND APPLICATIONS
OF STREPTOMYCIN, BRUCEIDIN AND R.
LEUCISTUS, STILL CURE AREA
OF LECOM.

| Date of Appli-
cation | Plot Number | Chemical Used | Concen-
tration
lbs. per 100 gal. H ₂ O | pH of
Spray | Cal-
lons Used | R. bruceidinum | | | R. leucistus | | |
|--------------------------|----------------------|------------------------------|--|----------------|-------------------|----------------|-----------|-----------|--------------|-----------|-----------|
| | | | | | | Live | Stem Kill | Bush Kill | Live | Stem Kill | Bush Kill |
| 7/31/29 | Area 11
I A (0-2) | NaClO ₃ +
NaOH | 1.40
0.08 | | 5 | - | - | - | 99 | 75 | 80 |
| 7/31/29 | Area 11
I A (2-3) | NaClO ₃ | 1.40 | 6.8 | 4 | 95 | 0 | 24 | 98 | 49 | 53 |

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B. Discussion of Results Obtained from 1929 Experiments.

Idaho: The mixture of magnesium chloride and sodium chlorate applied in several concentrations on Plot XI resulted in a fire of spontaneous origin 11 days after application. Therefore the kill shown in Table No. 1 for these experiments represents the effect of an extremely hot burn plus the action of the chemical. The toxic action of X and Y copper complex sprays on A. inermis was unsatisfactory. It is evident that the complex compound is not stable enough under the influence of reactive plant constituents to permit translocation of the chemical into root tissue. None of the sprays tested in 1929 showed sufficient kill of A. inermis to be recommended for large scale application. The results of sprays applied to plot numbers 4-14 (see Table No. 1) which were considered to be so poor as not to justify searching out crows for a bush kill figure.

California: Reference to Table No. 2 shows that X and Y sprays were ineffective on A. nevadense, E. roezli and E. inermis (Meadow Valley). The addition of magnesium chloride to X at Meadow Valley noticeably increased the live stem kill. Figures for A. nevadense at Island Meadow should be considered in the light of the age of the bushes and highly shaded conditions under which they are growing. The application of a magnesium chloride and sodium chlorate mixture to E. roezli and A. cereum at Gooseberry Camp was followed by a fire of spontaneous origin similar to the one at Santa, Idaho. The fire at Gooseberry Camp was very light and occurred the morning after application of the spray, most of the chemical was washed off the bushes in extinguishing the fire. This accounts for the small injury to the California species compared with the injury produced at Santa, Idaho. Data were retained over the 1928 experimental plots in 1929 and compared with those taken in 1927. E. roezli's power of regeneration is shown by these data to be much greater than that of A. nevadense, a 50% bush kill for the former and 35% bush kill for the latter being representative of this difference. The effect of age on the general susceptibility of bushes to chemical treatment is shown by the high kill obtained on A. nevadense at Island Meadows.

Experiments are given in Table No. 3. The writer made

Oregon: X and Y sprays were relatively ineffective on the following Oregon species: A. lacustre, A. bracteatum, A. triste, A. californicum and E. sanguineum. Injury appears to increase with concentration of the X or Y spray but in no case did it exceed 63% kill of live stems. E. triste is particularly resistant to copper complex sprays. The shade form of E. bracteatum is more injured than the sun form. Further observations concerning the effect of chlorates on Oregon

TOEPLITZ and B. INES (Meadow Valley)

Following Great Britain's lead, the United States also

species are (1) small heavily shaded R. bracteosum are more susceptible than small sun forms, (2) large open forms of R. lacustre and R. bracteosum are more susceptible than small sun forms and are generally killed back to the crown, in contrast with a somewhat incomplete live stem kill in the smaller sun forms. Solutions of sodium chlorate or Atlacide stronger than 15% by weight are fairly satisfactory on R. lacustre and on shaded R. bracteosum but are not effective on open forms of R. bracteosum. The second application of alkaline and acid chlorate sprays to R. lacustre and R. bracteosum as shown in Table No. 4 did not result in complete eradication of either species.

C. Application of New Herbicides in Idaho, California and Oregon During 1930.

Idaho: New herbicides were tested by (1) spray application, and (2) stem and crown injection to R. petiolare, R. intrum and R. lacustre at Santa, Idaho, by A. Bickford, G. A. Van Atta and the writer. Table No. 5 summarizes the spray experiments. Crown and stem injections of various chemicals made taken by Van Atta, Bickford and the writer are reported in tables No. 6 and 7. These latter experiments were made almost entirely on R. intrum.

California: Sprays were applied by d'Urbal and Quick to R. roezli and R. nevadense on plots located near Leland Meadow and Strawberry, Stanislaus National Forest, California. Table No. 8 summarizes these experiments. The map which follows Table No. 8 gives the location of these spray experiments. Special crown injection experiments undertaken by Van Atta are reported in graphic form with a legend providing the experimental data.

Oregon: New herbicides were tested on R. bracteosum and R. lacustre near Planter's Cabin, Still Creek, and on R. watsonianum located near the Loop Highway on the South Fork of Iron Creek. At Buckleberry Mountain, Crater Lake National Forest, Atlacide sprays were applied to R. hallii. On Crater Lake National Park experimental plots were established in a suitable area of R. erythrocarpum. Results of these experiments are given in Table No. 9. The writer made several crown injections of copper complex to R. sanguineum close to the R. watsonianum plots on the Loop Highway. These applications were made to the acidified crowns of R. sanguineum on August 3. On August 27 a re-spray of NaClO₃ 30% was made on R. watsonianum Plot IV, Loop Highway.

Copper complex from lot made in Spokane by E. R. D'Ford.
 100 cc. in each gal. water 60 gms. sodium acetate and 343.5 cc. HCl (350 cc. conc. HCl diluted to 1000 cc.).
 100 cc. in each gal. water 60 gms. sodium acetate and 45 cc. HCl (350 cc. conc. HCl diluted to 1000 cc.).
 Sodium acetate plus sodium acetate to pH 9.
 Atlacide Oil usually sold as such and procured from Standard Oil Co., Spokane, Wash.

Sprays applied to R. lacustre and R. lacustre.
 Sodium chlorate sprays applied to R. lacustre.
 Atlacide sprays applied to R. lacustre.

TABLE NO. 5

SUMMARY OF EXPERIMENTAL SPRAYS APPLIED AT SANTA, IDAHO
DURING 1930 FIELD SEASON

| Date of Appli-
cation | Plot Number | Chemical Used | Concentration
in Parts by
Volume or
Lbs. Per
Gal. H ₂ O. | pH of
Spray | Gal-
lons
Spray
Used | At Time of Application | | |
|--------------------------|-----------------------------------|---|---|----------------|-------------------------------|---|---|---------------|
| | | | | | | Average
Soil Temp.
7:30 a.m.
to 5 p.m.
Degrees F. | Average
Relative
Humidity
7:30 a.m.
to 5 p.m. | Weather Log |
| 7/7/30 | III A (2-3) | Pitch Oil (1) | As Furnished | | 6 | 61 | 38 | Warm. Clear. |
| 7/8/30 | III A (6-6.6) | Pitch Oil
+ Pyridene | 100 parts
1 part | | 2 | 63 | 44 | Hot. Clear. |
| 7/8/30 | V A (1-2) | Pitch Oil
+ Furfural | 20 parts
1 part | | 2 | 63 | 44 | Hot. Clear. |
| 7/10/30 | V B (2-2.3) | Pitch Oil
+ Toluene | 50 parts
1 part | | 1 | 68 | 74 | Warm. Cloudy. |
| 7/10/30 | V B (2.3-3) | Pitch Oil
+ Benzene | 50 parts
1 part | | 1 | 68 | 74 | Warm. Cloudy. |
| 7/10/30 | V A (2-3) | Pitch Oil
+ Naphthalene | 50 parts
1 part | | 1½ | 68 | 74 | Warm. Cloudy. |
| 7/16/30 | I B (3-4) | X (2) | 2.06# | 10.0 | 5½ | 62 | 68 | Warm. Clear. |
| 7/16/30 | I B (4-5) | X
+ Glue | 2.6#
0.02# | 10.0 | 4½ | 62 | 68 | Warm. Clear. |
| 7/17/30 | IV B (1-2) | Pitch Oil
+ Cresylic Acid | 50 parts
1 part | | 2 | 63 | 62 | Warm. Clear. |
| 7/17/30 | IV A (3-4) | Pitch Oil
+ Phenol | 50 parts
1 part | | 2 | 63 | 62 | Warm. Clear. |
| 7/24/30 | III B (6-6.3) | Cadmium sulphate
+ Glycerine | .25#
.02# | 6.5 | 2 | 60 | 53 | Warm. Clear. |
| 7/24/30 | III B (6.3-6.6) &
II B (5-5.6) | Cadmium chloride
+ Glycerine | .25#
.02# | 6.5 | 2 | 60 | 53 | Warm. Clear. |
| 7/30/30 | Opposite B (1-2) | Silver nitrate
+ Sodium thiosulphate | .45#
4.2# | | ½ | 59 | 62 | Hot. Clear. |
| 7/30/30 | Opposite
VIII B (1-2) | Silver nitrate | .45# | | ½ | 59 | 62 | Hot. Clear. |
| 8/1/30 | Ex. 1 | A + Buffer (3) | .45# | 4.0 | 6 | 59 | 60 | Warm. Clear. |
| 8/2/30 | Ex. 2 | A | .45# | 6.0 | 6 | 56 | 72 | Warm. Clear. |
| 8/2/30 | Ex. 3 | A + Buffer (3) | .45# | 4.0 | 6 | 56 | 72 | Warm. Clear. |
| 8/4/30 | Ex. 4 | A + Buffer (4) | .45# | 5.0 | 6 | 54 | 67 | Hot. Clear. |
| 8/5/30 | Ex. 5 | A + Buffer (3) | .32# | 4.0 | 6 | 56 | 60 | Hot. Clear. |
| 8/5/30 | Ex. 6 | A | .32# | 6.0 | 6 | 56 | 60 | Hot. Clear. |
| 8/5/30 | Ex. 7 | A + Buffer (4) | .32# | 5.0 | 6 | 56 | 60 | Hot. Clear. |
| 8/11/30 | Ex. 8 | A + Buffer (5) | .45# | 3.0 | 6 | 57 | 67 | Hot. Clear. |
| 8/12/30 | Ex. 9 | A + Buffer (5) | .32# | 3.0 | 6 | 56 | 77 | Hot. Clear. |
| 8/13/30 | Ex. 10 | Atlacide and
Buffer (3) | 3.00# | 4.0 | 6 | 57 | 88 | Warm. Clear. |
| 8/13/30 | Ex. 11 | Atlacide and
Buffer (4) | 3.00# | 5.0 | 6 | 57 | 88 | Warm. Clear. |
| 8/14/30 | X A (4.7-5) | Diesel Oil (6)
+ Pitch Oil | 2 parts
1 part | | 3 | 59 | 71 | Warm. Cloudy. |
| 8/14/30 | X B (3.9-5) | Diesel Oil
+ Pitch Oil | 3 parts
1 part | | 2 | 59 | 71 | Warm. Cloudy. |
| 8/14/30 | X A (2.6-4.7) | Diesel Oil
+ Pitch Oil | 4 parts
1 part | | 2½ | 59 | 71 | Warm. Cloudy. |
| 8/14/30 | X B (3-3.9) | Diesel Oil | As furnished. | | 2 | 59 | 71 | Warm. Cloudy. |
| 8/16/30 | III B (2-2.5) | Diesel Oil
+ Pyridene | 100 parts
1 part | | 2 | 55 | 65 | Warm. Clear. |
| 8/16/30 | III B (2.5-3.1) | Diesel Oil
+ Furfural | 20 parts
1 part | | 2 | 55 | 65 | Warm. Clear. |
| 8/16/30 | III B (3.1-4) | Diesel Oil
+ Cresylic Acid | 50 parts
1 part | | 2 | 55 | 65 | Warm. Clear. |
| 8/16/30 | III A (3-4) | Diesel Oil
+ Toluene | 50 parts
1 part | | 2 | 55 | 65 | Warm. Clear. |
| 8/20/30 | II A (2-2.5) | Diesel Oil
+ Benzene | 50 parts
1 part | | 2 | 56 | 68 | Warm. Clear. |
| 8/20/30 | II B (2.5-3) | Diesel Oil
+ Naphthalene | 50 parts
1 part | | 2 | 56 | 68 | Warm. Clear. |
| 8/20/30 | II B (1-1.4) | X
+ Glycerine | 4.12#
0.45# | 11.0 | 2 | 56 | 68 | Warm. Clear. |
| 8/20/30 | II B (1.4-2) | X
+ Glycerine
+ Glue | 4.12#
0.45#
0.04# | 11.0 | 2 | 56 | 68 | Warm. Clear. |

(1) Pitch Oil, a product of coal tar distillation secured from Koppers Company, Pittsburgh, Pa.

(2) Standard copper complex from lot made in Spokane by H. R. Offord.

(3) Contains in each gal. water 62 gms. sodium acetate and 393.5 cc. HCl (350 cc. com. HCl diluted to 1000 cc.).

(4) Contains in each gal. water 62 gms. sodium acetate and 46 cc. HCl (350 cc. com. HCl diluted to 1000 cc.).

(5) Contains sodium acetate plus sodium hydroxide to pH 9.

(6) Standard Diesel Oil usually sold as fuel oil. Procured from Standard Oil Co., Spokane, Wash.

Note: Oil sprays applied to *E. inermis* and *E. lacustris*.Buffered sodium chlorate sprays applied to *E. petiolare*.Buffered Atlacide sprays applied to *E. inermis*.

TABLE NO. 6

CROWN AND STEM TREATMENTS GIVEN TO
R. INERMIE AT SANTA, IDAHO, 1930.

| Date of Experiment | Experiment Number | Method of Treatment (See Legend) | Chemical Used | No. Crowns or Stems Treated | Results as Noticed at End of Season |
|--------------------|-------------------|----------------------------------|------------------------|-----------------------------|-------------------------------------|
| 7/18/30 | 1 | #1 | X | 3 | Poor |
| 7/18/30 | 2 | #2 | X | 3 | Fair |
| 7/18/30 | 3 | #3 | X | 3 | Good |
| 7/18/30 | 4 | #4 | X | 3 | Poor |
| 7/18/30 | 5 | #1 | Pitch oil | 3 | Poor |
| 7/18/30 | 6 | #2 | Pitch oil | 3 | Poor |
| 7/18/30 | 7 | #3 | Pitch oil | 3 | Good |
| 7/18/30 | 8 | #4 | Pitch oil | 3 | Poor |
| 7/18/30 | 9 | #5 | Pitch oil | 3 | Fair |
| 7/19/30 | 10 | #1 | Bismuth subbenzoate | 3 | Poor |
| 7/19/30 | 11 | #2 | Bismuth subbenzoate | 3 | Poor |
| 7/19/30 | 12 | #3 | Bismuth subbenzoate | 3 | Poor |
| 7/19/30 | 13 | #4 | Bismuth subbenzoate | 3 | Poor |
| 7/19/30 | 14 | #1 | Arsenic oxide | 3 | Good |
| 7/19/30 | 15 | #2 | Arsenic oxide | 3 | Good |
| 7/19/30 | 16 | #3 | Arsenic oxide | 3 | Good |
| 7/19/30 | 17 | #4 | Arsenic oxide | 3 | Poor |
| 7/28/30 | 18 | #1 | Cadmium sulphate | 3 | Good |
| 7/28/30 | 19 | #2 | Cadmium sulphate | 3 | Good |
| 7/28/30 | 20 | #3 | Cadmium sulphate | 3 | Good |
| 7/28/30 | 21 | #4 | Cadmium sulphate | 3 | Poor |
| 7/28/30 | 22 | #1 | Cadmium chloride | 3 | Good |
| 7/28/30 | 23 | #2 | Cadmium chloride | 3 | Good |
| 7/28/30 | 24 | #3 | Cadmium chloride | 3 | Good |
| 7/28/30 | 25 | #4 | Cadmium chloride | 3 | Poor |
| 7/30/30 | 26 | #6 | Soluble copper cyanide | 3 | Fair |
| 7/30/30 | 101 | #6 | Soluble copper cyanide | 2 | Fair |
| 7/31/30 | 27 | #1 | Fluorescein | 2 | Poor |
| 7/31/30 | 28 | #2 | Fluorescein | 2 | Poor |
| 7/31/30 | 29 | #3 | Fluorescein | 2 | Poor |
| 7/31/30 | 30 | #4 | Fluorescein | 2 | Poor |
| 7/31/30 | 31 | #1 | Silver nitrate | 2 | Poor |
| 7/31/30 | 32 | #2 | Silver nitrate | 2 | Poor |
| 7/31/30 | 33 | #3 | Silver nitrate | 2 | Poor |
| 8/1/30 | IV A (1-1.3) | #6 | X - 25% | 25 | Fair |
| 8/14/30 | IV A (1.3-1.6) | #6 | A - 25% | 12 | Fair |
| 8/19/30 | II A (2-3) | #7 | X + Eosine | 20 - 30 | Good |
| 8/21/30 | 34 | #7 | X + Eosine | 4 | Good |

- Method #1** - Portion of bark over crown scraped off with knife and chemical applied to wound as aqueous paste.
- Method #2** - Crown notched into xylem and chemical applied to wound as aqueous paste.
- Method #3** - Crown scratched with pruning saw and chemical applied as aqueous paste.
- Method #4** - Stems cut off several inches above ground and thin aqueous paste applied to ends of cut off stems.
- Method #5** - Chemical applied in aqueous solution (or oil) about crown. No scarification of crown or stems.
- Method #6** - One or more holes drilled into crown below stem tissue with Yankee twist drill. Chemical injected into these holes in aqueous solution by means of a modified Zerk grease gun.
- Method #7** - One or more stems slit with knife near crown and chemical in form of thick aqueous paste packed into the slit stem.

| | | | | | | |
|---------------------|-------------|---------------|----------|------|-----------------------|---------------------|
| Date of Application | Plot Number | Concentration | Days Per | Loss | Cal. or pH of Sprayer | by Vol. Sprayer Use |
| | | | | | | |

ABSORPTION AND MOVEMENT OF INJECTED SOLUTIONS
 IN STUMP BY INJECTION

| Expt. No. | Date of Treatment | Species | Duration of Treatment | Distance Stain Moved | | Quantity of Solution Absorbed |
|-----------|-------------------|---------------------|-----------------------|----------------------|--------|-------------------------------|
| | | | | Up | Down | |
| 1 | Aug. 14 | <i>R. inermis</i> | 30 min. | 11-1/2" | 3" | 1.5 cc. |
| 2 | " | <i>R. petiolare</i> | 30 " | 33" | 5" | 0.3 cc. |
| 3 | " | <i>R. lacustre</i> | 20 " | 17" | 4-1/4" | Not measured |
| 4 | " 15 | <i>R. inermis</i> | 45 " | 25" | 4-1/2" | " |
| 5 | " | <i>R. inermis</i> | 45 " | 21" | 2-1/2" | " |
| 6 | " | <i>R. inermis</i> | 45 " | 7" | 1-1/2" | " |
| 7 | " | <i>R. petiolare</i> | 30 " | 4-1/2" | 7" | 0.9 cc. |
| 8 | " | <i>R. petiolare</i> | 30 " | 15" | 5" | 0.1 cc. |
| 9 | " | <i>R. petiolare</i> | 30 " | 24" | 3-1/2" | Not measured |
| 10* | Aug. 13-20 | <i>R. inermis</i> | 48 hrs. | 96" | 24" | 5.9 cc. |
| 11** | " 21-23 | <i>R. petiolare</i> | 48 " | 73" | 12" | Not measured |
| 12*** | " 23-25 | <i>R. petiolare</i> | 48 " | 30" | 7" | " |
| 13 | " 25 | <i>R. inermis</i> | 30 min. | 7-1/2" | 3-1/2" | " |

* Leaves and small twigs deeply colored. Radial spread not appreciable. Rays unstained. Circumferential spread through annual rings. Longitudinal spread at distance from point of injection entirely through new xylem. Old xylem only stained in vicinity of point of injection.

** Reservoir had leaked during experiment. Leaves deeply stained. Wood rays more deeply stained than in case of *R. inermis* similarly treated.

*** Scant circumferential spread.

August ratio of movement up to movement down:
R. inermis 3.81 : 1
R. petiolare 5.80 : 1
R. lacustre 4.0 : 1

Figures given in experiment 13 are not included in the above, since these results are not comparable.

- (3) Sample of California oil contained no pitch oil. Furnished by Mr. J. H. ...
- (4) Symbol for standard copper complex made in Spokane by H. R. ...
- (5) Atomometer, an instrument used for determining the rate of evaporation first time in our work.

- * The weather was clear and sunny.
- ** No buffer.

INFECTION AND MOVEMENT OF INJECTED SUBSTANCES
AS SHOWN BY XYLEM SOLUTION

| Expt. No. | Date of Treatment | Species | Location of Treatment | Distance from Inoculation | | Quantity of Solution Absorbed |
|-----------|-------------------|---------------------|-----------------------|---------------------------|--------|-------------------------------|
| | | | | Up | Down | |
| 1 | Aug. 14 | <i>E. igneum</i> | 30 min. | 11-1/2" | 2" | 1.5 cc. |
| 2 | " | <i>E. petiolare</i> | 30 " | 32" | 5" | 0.5 cc. |
| 3 | " | <i>E. lacustre</i> | 30 " | 15" | 4-1/4" | Not measured |
| 4 | " | <i>E. igneum</i> | 45 " | 52" | 7-1/2" | " |
| 5 | " | <i>E. igneum</i> | 45 " | 39" | 7-1/4" | " |
| 6 | " | <i>E. igneum</i> | 45 " | 7" | 1-1/2" | " |
| 7 | " | <i>E. petiolare</i> | 30 " | 43-1/2" | 7" | 0.5 cc. |
| 8 | " | <i>E. petiolare</i> | 30 " | 15" | 5" | 0.1 cc. |
| 9 | " | <i>E. petiolare</i> | 30 " | 24" | 7-1/2" | Not measured |
| 10* | Aug. 15-20 | <i>E. igneum</i> | 40 hrs. | 92" | 34" | 0.0 cc. |
| 11** | " | <i>E. petiolare</i> | 45 " | 73" | 15" | Not measured |
| 12*** | " | <i>E. petiolare</i> | 45 " | 30" | 7" | " |
| 13 | " | <i>E. igneum</i> | 30 min. | 5-1/2" | 0-1/2" | " |

* leaves and small twigs deeply colored. Lateral spread not noticeable. Xylem unstained. Circumferential spread through annual rings. Lateral spread at distance from point of injection entirely through new xylem. Old xylem only stained in vicinity of point of injection.

**Reservoir had leaked during experiment. Leaves deeply stained. Wood rays were deeply stained than in case of *E. igneum* similarly treated.

***Scand circumferential spread.

Logarithmic ratio of movement up to movement down:
E. igneum 3.81 : 1
E. petiolare 3.60 : 1
E. lacustre 4.0 : 1

Figures given in experiment 13 are not included in the above, since these results are not comparable.

TABLE NO. 8

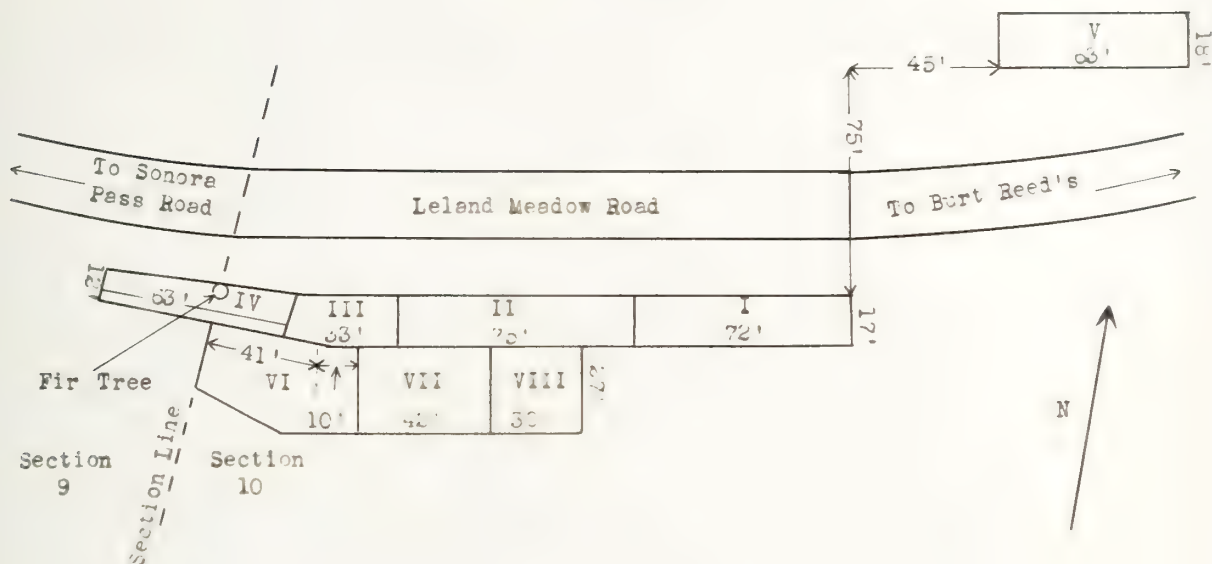
SUMMARY OF EXPERIMENTAL SPRAYS APPLIED IN CALIFORNIA
DURING 1930 FIELD SEASON

| Date of Appli-
cation | Plot Number | Chemical Used | Concen-
tration
Lbs. Per
Gal. or
% by Vol. | pH of
Spray | Gal-
lons
Spray
Used | At Time of Application | |
|--------------------------|--|---|--|----------------|-------------------------------|------------------------------|---|
| | | | | | | (5)
Atmosphere
Reading | Average
Relative
Humidity
7:30 a.m.
to 5 p.m. |
| | Leland Meadows
Sec. 10, E. 18
E. T. 4N., | | | | | | |
| 7/1/30 | 1 | Atlacide | 1.4 | 5.0 | | 5.1 | 47 |
| 7/1/30 | 2 | Atlacide | 1.4 | 3.6 | 5 | 5.1 | 47 |
| 7/1/30 | 3 | Atlacide | 1.4 | 4.0 | 5 | 5.1 | 47 |
| 7/1/30 | 4 | Atlacide | 1.4 | 4.5 | 5 | 5.1 | 47 |
| 7/2/30 | 5 | Atlacide | 2.4 | 5.0 | 5 | 5.8 | 46 |
| 7/2/30 | 6 | Pitch Oil + Toluol | 5% | | 5 | 5.8 | 46 |
| 7/2/30 | 7 | Atlacide | 3.6 | 3.6 | 5 | 5.8 | 46 |
| 7/1/30 | 8 | Atlacide | 2.4 | 4.5 | 5 | 5.1 | 47 |
| 7/1/30 | 9 | A | 1.4 | 3.5 | 5 | 5.1 | 47 |
| 7/1/30 | 10 | A | 0.89 | 5.0 | 5 | 5.1 | 47 |
| 7/1/30 | 11 | A | 0.89 | 4.5 | 5 | 5.1 | 47 |
| 7/1/30 | 12 | A | 0.89 | 4.0 | 5 | 5.1 | 47 |
| 6/24/30 | 13 | A | 0.89 | 3.6 | 5 | 5.5 | 37 |
| 7/1/30 | 14 | Atlacide | 2.4 | 4.0 | 5 | 4.4 | 40 |
| 6/24/30 | 15 | Atlacide | 2.4 | 4.0 | 5 | 5.5 | 37 |
| 6/24/30 | 16 | Pitch Oil + Phenol | 2% | | 5 | 5.5 | 37 |
| 6/24/30 | 17 | A | 0.44 | 4.5 | 5 | 5.5 | 37 |
| 6/24/30 | 18 | A | 0.44 | 5.0 | 5 | 5.5 | 37 |
| 6/24/30 | 19 | Atlacide | 2.4 | 4.0 | 5 | 5.5 | 37 |
| 6/25/30 | 20 | A | 0.44 | 4.0 | 5 | 4.3 | 44 |
| 6/25/30 | 21 | A | 0.44 | 5.0 | | 4.9 | 44 |
| 6/25/30 | 22 | Pitch Oil + Pyridene | 5% | | 5 | 4.9 | 44 |
| 6/25/30 | 23 | Pitch Oil + Cresol | 2% | | 5 | 4.9 | 44 |
| 6/25/30 | 24 | Pitch Oil + Furfural | 5% | | 5 | 4.9 | 44 |
| 6/25/30 | 25 | Pitch Oil + Benzol | 2% | | 5 | 4.9 | 44 |
| 6/30/30 | 26 | A | 0.89 | ** | 5 | 5.0 | 45 |
| 6/30/30 | 27 | A | 1.4 | ** | 5 | 5.0 | 45 |
| 6/30/30 | 28 | A | 0.44 | ** | 5 | 5.0 | 45 |
| 6/30/30 | 29 | Atlacide | 0.67 | ** | 5 | 5.0 | 45 |
| 6/30/30 | 30 | Atlacide | 1.4 | ** | 5 | 5.0 | 45 |
| 6/30/30 | 31 | Atlacide | 2.4 | ** | 5 | 5.0 | 45 |
| 6/30/30 | 32 | Pitch Oil + Naphthalene | 5% | | 5 | 5.0 | 45 |
| | Strawberry,
T. 4 N., E. 18
E., Sec. 2. | | | | | | |
| 6/23/30 | 1 | Pearl Oil
Sulphur Dioxide Extract
Mineral Oil | | | 5 | 5.5 | 39 |
| 6/23/30 | 2 | Sulphur Dioxide Extract | | | 5 | 5.5 | 39 |
| 6/23/30 | 3 | De Ong Oil (3) | 15% | | 2 | 5.5 | 39 |
| 6/23/30 | 4 | De Ong Oil | 10% | | 2 | 5.5 | 39 |
| 6/24/30 | 5 | Diesel Oil | | | 5 | 5.5 | 37 |
| 6/24/30 | 6 | Pitch Oil + Diesel Oil | 50% + 50% | | 5 | 5.5 | 37 |
| 6/24/30 | 7 | Pitch Oil + Diesel Oil | 25% + 75% | | 5 | 5.5 | 37 |
| 6/24/30 | 8 | Pitch Oil + Diesel Oil | 12% + 88% | | 5 | 5.5 | 37 |
| | | Diesel Oil | 98% | | | | |
| | | + Phenol | 1% | | | | |
| | | + Cresol | 1% | | | | |
| 6/23/30 | 9 | Diesel Oil + Pyridene | 25% + 5% | | 5 | 5.5 | 39 |
| | | Diesel Oil | 88% | | | | |
| | | + Naphthalene | 5% | | | | |
| | | + Toluol | 5% | | | | |
| | | + Cresol | 1% | | | | |
| | | + Phenol | 1% | | | | |
| 6/23/30 | 11 | Diesel Oil + Furfural | 25% + 5% | | 5 | 5.5 | 39 |
| 6/23/30 | 12 | X | | | 5 | | |
| 6/24/30 | 13 | X (4) | 2.7 | 11.0 | 5 | 5.5 | 37 |
| 7/4/30 | 14 | A | 1.4 | 5.0 | 5 | 4.4 | 40 |
| 6/24/30 | 15 | X | 2.7 | 6.5 | 5 | 5.5 | 37 |
| 6/24/30 | 16 | X | 3.5 | 11.0 | 5 | 5.5 | 37 |
| 6/24/30 | 17 | X | 3.6 | 6.3 | 5 | 5.5 | 37 |
| 7/24/30 | 18 | A | 1.4 | 4.0 | 5 | 4.4 | 40 |
| 7/24/30 | 19 | A | 1.4 | 4.5 | 5 | 4.4 | 45 |

- (1) Pitch Oil, a by-product of coal tar distillation secured from Koppers Company, Pittsburgh, Pa.
 (2) Symbol for sodium chloride.
 (3) Sample of California oil equivalent to pitch oil. Furnished by Mr. E. R. De Ong of San Francisco.
 (4) Symbol for standard copper complex made in Spokane by H. R. Offord.
 (5) Atmometer, an instrument used for determining the rate of evaporation. Used this year for the first time in our work.

* The weather was clear and sunny during the entire period of experimentation.
 ** No buffer.

PRESSURE CROWN INJECTION EXPERIMENTS ON R. ROEHLI
STANISLAUS NATIONAL FOREST, CALIFORNIA
1930



| Date of Treatment | Plot No. | Chemical Used | No. Bushes Treated |
|-------------------|----------|--|--------------------|
| July 16, 1930 | I | 25% Soln. NaClO_3 + eosine | 6 |
| July 16, 1930 | II | 25% Soln. $\text{Na}_3\text{Cu}(\text{CN})_4$ + eosine | 10 |
| July 16, 1930 | III | 25% Soln. $\text{CCl}_3\text{CH}_3\text{O}_2$ + eosine | 4 |
| July 16, 1930 | IV | 25% Soln. X | 5 |
| July 16, 1930 | V | 25% Soln. Cr complex | 5 |
| July 21, 1930 | VI* | 25% Soln. NaClO_3 | 6 |
| July 21, 1930 | VII* | Diesel Oil | 5 |
| July 21, 1930 | VIII | Diesel Oil | 6 |

*Tops of bushes removed and crown exposed prior to injection.

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TABLE NO. 9

SUMMARY OF EXPERIMENTAL SPRAYS APPLIED IN OREGON
DURING 1930 FIELD SEASON

| Date of Appli-
cation | Plot Number | Chemical Used | Concen-
tration
Lbs.
Per Gal.
H ₂ O. | pH of
Spray | Gal-
lons
Spray
Used | At Time of Application | |
|--------------------------|-----------------------------|------------------------------|---|----------------|-------------------------------|------------------------|-----------------------------------|
| | | | | | | Relative
Humidity | Weather Log |
| 8/5/30 | Still Creek
I | A | 0.89 | 4.0 | 5 | p.m. 46 | Warm. Breezy. |
| 8/6/30 | II (0-1) | A
+ Calcium
chloride | 2.70
2.70 | 7.0 | 5 | a.m. 52 | Warm. Clear. |
| 8/28/30 | II (2-3) | A
+ Sodium
chloride | 1.40
1.40 | 3.5 | 5 | a.m. 21 | Clear. Very dry. |
| 8/5/30 | II (0-1) | Atlacide | 3.60 | 3.5 | 5 | p.m. 46 | Warm. Breezy. |
| 8/5/30 | III (1-2) | A | 0.89 | 4.0 | 5 | p.m. 46 | Warm. Breezy. |
| 8/5/30 | IV | Atlacide | 3.60 | 9.0 | 5 | p.m. 46 | Warm. Breezy. |
| 8/28/30 | V | A
+ Sodium
chloride | 0.89
2.08 | 3.5 | 5 | a.m. 21 | Clear. Very dry. |
| 8/28/30 | VI | A
+ Sodium
chloride | 0.44
2.70 | 3.5 | 5 | a.m. 21 | Clear. Very dry. |
| 8/4/30 | I A (3-3.5) | A | 2.08 | 4.0 | 5 | a.m. 79 | Clear. |
| 8/4/30 | I A (3.5-4) | A | 1.40 | 4.0 | 5 | a.m. 79 | Clear. |
| 8/4/30 | I B (3-3.5) | A | 2.08 | 3.5 | 5 | a.m. 79 | Clear. |
| 8/4/30 | I B (3.5-4) | A | 1.40 | 3.5 | 5 | a.m. 79 | Clear. |
| 8/6/30 | VII A (0-1) | A | 0.89 | 4.0 | 5 | a.m. 52 | Clear. Warm. |
| 8/5/30 | VII A (1-2) | Atlacide | 3.60 | 3.5 | 5 | p.m. 46 | Warm. Breezy. |
| 8/5/30 | VII A (2-3) | Atlacide | 3.60 | 2.0 | 5 | p.m. 46 | Warm. Breezy. |
| 8/5/30 | VIII | A | 2.08 | 7.0 | 5 | p.m. 46 | Clear. |
| 8/7/30 | IX | A | 0.89 | 7.0 | 5 | a.m. 80 | Overcast. |
| 8/7/30 | X | Diesel Oil | 100% | | 5 | a.m. 80 | Overcast. |
| 8/6/30 | XI (0-1) | A | 1.40 | 7.0 | 5 | a.m. 59 | Clear. Warm. |
| 8/6/30 | XI (1-2) | A
+ Calcium
chloride | 2.70
2.70 | 9.0 | 5 | a.m. 59 | Clear. Warm. |
| 8/4/30 | XII (0-1) | A | 2.08 | 4.0 | 5 | a.m. 72 | Clear. |
| 8/6/30 | XII (1-2) | A | 0.89 | 4.0 | 5 | a.m. 59 | Clear. Warm. |
| 8/7/30 | XIII | Diesel Oil
+ Furfural | 25%
5% | | 5 | a.m. 80 | Overcast. |
| 8/7/30 | Loop High-
way I | A | 2.08 | 3.5 | 5 | p.m. 50 | Warm. |
| 8/7/30 | II | A | 2.08 | 7.0 | 5 | p.m. 50 | Warm. |
| 8/27/30 | IV | A
(Re-spray 1922
plot) | 2.08 | 7.0 | 2 | p.m. 50 | Warm. |
| 8/23/30 | Huckleberry
Mt.
VII | Atlacide | 3.60 | 7.0 | | | |
| 8/23/30 | VII | Atlacide | 3.60 | 4.0 | | | |
| 8/16/30 | Crater Lake
N.P. IA(0-1) | Atlacide | 1.40 | 6.5 | | Low | Cool with occa-
sional clouds. |
| 8/16/30 | IA(1-2) | Atlacide | 1.40 | 4.5 | | Low | |
| 8/16/30 | IA(2-3) | Atlacide | 3.60 | 6.5 | | Low | |
| 8/16/30 | IB(0-1) | Atlacide | 0.67 | 6.5 | | Low | |
| 8/16/30 | IB(1-2) | Atlacide | 0.67 | 4.5 | | Higher | Overcast Sun |
| 8/18/30 | IB(2-3) | Atlacide | 3.60 | 4.5 | | than 16th | at intervals |

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D. Late Season Notes on 1930 Experiments in Idaho, California and Oregon. 1d experiments.

No conclusions could be drawn regarding the increased toxicity of buffered sodium chlorate and Atlacide solutions. Pitch oil proved to be so irritating to exposed skin that its use as a herbicide is not contemplated. In general Diesel oil proved to be quite as toxic as the pitch oil. No releasing was observed on E. rogersii which had been sprayed with Diesel oil. Dilute cadmium sulphate and cadmium chloride sprayed on E. inaequalis showed complete kill of live stem at the end of the growing season. This might be used as indicated either as a preliminary or following treatment in combination with hand eradication.

Copper complex, cadmium sulphate, cadmium chloride and sodium chlorate are excellent killing agents when injected into or applied to incisions on stems or roots. A method of packing a copper complex paste into the basal portions of E. inaequalis stems subsequent to slitting these stems appeared to merit further investigation. E. inaequalis so treated showed excellent top kill though a possibility of re-sprouting exists. These experiments will be watched with interest next year. E. rogersii infected with copper complex by means of a Zerk pressure gun showed some re-sprouts at the end of the field season. Some crown and stem injections made September 14 and 15 by Patty and Pierson near Cow Creek were made too late in the season to be significant. Iodine and copper complex were tested in these experiments by the stem injection method.

RECOMMENDATIONS FOR LARGE-SCALE APPLICATION OF CHEMICALS, 1931

Recommendations for the chemical eradication of E. petiolaris are now made as follows:

1. For early season up to July 15:

NaClO_3 0.5% per gallon of water at pH of 6.1 - 6.3.

2. For mid-season work, July 15 to August 15:

Atlacide 1.04% per gallon of water at pH of 6.1 - 6.3.

3. For work done after August 15:

NaClO_3 0.89% per gallon of water at pH of 6.1 - 6.3.

These recommendations are based on an analysis of field data from Santa and Clarkia, Idaho, and on a laboratory study of the total

E. Late Season Notes on 1930 Experiments in Idaho, California and Oregon.

No conclusions could be drawn regarding the increased toxicity of sulfuric acid and Alkaline solutions. Field oil proved to be as effective as exposed when the use of a Bifoliate is not contemplated. In general Diesel oil proved to be quite as toxic as the field oil. No resistance was observed on E. rosea which had been sprayed with Diesel oil. Diesel solution sulphate and cadmium chloride sprayed on E. rosea showed complete kill of five plants at the end of the growing season.

Copper complex, cadmium sulphate, cadmium chloride and sodium chloride are excellent killing agents when injected into or applied to insects on stems or roots. A method of making a copper complex paste from the basal portions of E. rosea stems subsequent to killing them seems expected to merit further investigation. E. rosea as tested showed excellent top kill though a possibility of re-sprouting exists. These experiments will be watched with interest next year. E. rosea injected with copper complex by means of a leaf syringe and covered with paraffin as the end of the field season. Some cover and stem injection were made in September 1930 and 1931 and further work was done with the leaf in the season to be significant. Lathyrus and other complex were tested in these experiments of the stem injection method.

RECOMMENDATIONS FOR 1931-1932
APPLICATION OF CHEMICALS, 1931

Recommendations for the chemical treatment of E. rosea are now made as follows:-

1. For early season up to July 15:
NaClO₂ 0.2% per gallon of water at pH of 6.1 - 6.8.
2. For mid-season work, July 15 to August 15:
Alkaline 1.0% per gallon of water at pH of 6.1 - 6.8.
3. For work done after August 15:
NaClO₂ 0.2% per gallon of water at pH of 6.1 - 6.8.

These recommendations are based on an analysis of field data from Texas and California, Idaho, and on a laboratory study of the total

starch reserves which correlate in general the seasonal results obtained from field experiments.

For the eradication of R. inermis a dilute aqueous (0.5 to 1% per gallon water) solution of sodium chlorate applied to the soil about the crown of each plant has proved to be 100% effective. This method should be given a thorough test both as an initial method and as a follow-up method to the above sprays recommended for R. petiolare. Diesel oil applied as a spray and copper complex applied as a stem injection have shown real possibilities in preliminary tests. These chemicals might be used as indicated either as a preliminary or follow-up treatment in combination with hand eradication.

For the eradication of R. bracteosum NaClO_3 1.4% per gallon of water at a pH of 6.8 with the clean-up by hand pulling is recommended. A high kill of live stem is obtained with the sodium chlorate which satisfactorily prepares the ground for eradication of surviving root centers the ensuing year.

Crown applications of chlorates to R. roezli and R. nevadense are successful from the point of view of killing but the fire hazard and shortage of water involve too many difficulties for California work. Injection of copper complex into stems and crowns of R. roezli appears to be most practicable for field work.

A careful analysis of field data and results of laboratory investigations shows the following to be true:-

- (1) that no assurance can be given that in the near future a spray will be found which will give 100% kill of resistant Ribes with one application;
- (2) that the resistant Ribes can be successfully killed by chemical methods other than spraying.

In the light of these facts every effort should be made next year to make a comprehensive field study of (1) chemical methods, and (2) combination of chemical and hand pulling methods.

1. To assign to these investigations a number of the staff of the Office of Elkhorn Rust Control who shall be in direct charge of the work. All phases of the investigations shall be carried out with the full knowledge of the Office of Elkhorn Rust Control.
2. To plan and carry out a general survey of the field of Elkhorn Rust Control methods and to develop a system of eradication chemical eradication.

(Faint, illegible text at the bottom of the page)

[illegible][illegible]

Investigations shows the following to be true:-

Ribes with one application:

[illegible]

(2) completion of detailed and final building drawings.

In the light of these facts, it is felt that it would be wise and year to make a comprehensive final study of (1) structural methods, and

PART II

INVESTIGATIONS IN CHEMICAL METHODS FOR THE ERADICATION OF BARBERIES

Experimental work upon the chemical eradication of barberries was performed under the terms of a cooperative agreement with the Office of Barberry Eradication, Bureau of Plant Industry which resulted in the allotment of \$6,500 to this work from the appropriation for barberry eradication. The following Memorandum of Understanding between the Office of Blister Rust Control and the Office of Barberry Eradication gives the basis of this cooperative work:

MEMORANDUM OF UNDERSTANDING

Between

THE OFFICE OF BLISTER RUST CONTROL

and

THE OFFICE OF BARBERRY ERADICATION

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE.

Subject: Relative to

Cooperative Investigations on Chemical,
Methods of Eradicating Barberries.

Effective: April 15, 1930.

The object of this cooperative work is to determine chemicals which are toxic to barberry species and varieties known to be alternate hosts of the stem rust fungus, and to develop practical and economical methods of chemical eradication in the 13 north central grain growing states, Colorado, Illinois, Indiana, Iowa, Michigan, Minnesota, Montana, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin, and Wyoming. Laboratory headquarters for this work will be maintained at the University of California, Berkeley, California.

A. The Office of Blister Rust Control agrees:

1. To assign to these investigations a member of the staff of the Office of Blister Rust Control who shall be in direct charge of the work. All phases of the investigations shall be carried out with the full knowledge of the Office of Barberry Eradication.
2. To plan and carry out a general survey of the field of Barberry Eradication methods and to develop a program of research on chemical eradication.

INVESTIGATIONS IN CHEMICAL METHODS FOR THE DETERMINATION OF BERRY

Experimentation was conducted upon the chemical analysis of berry samples was performed under the terms of a cooperative agreement with the Office of Berry Investigation, Bureau of Plant Industry which resulted in the allotment of \$2,500 to this work from the appropriated for berry investigation. The following memorandum of understanding between the Office of Berry Investigation and the Office of Berry Investigation gives the basis of this cooperative work:

MEMORANDUM OF UNDERSTANDING
BETWEEN
THE OFFICE OF BERRY INVESTIGATION
AND
THE OFFICE OF PLANT INDUSTRY
BUREAU OF PLANT INDUSTRY
UNITED STATES DEPARTMENT OF AGRICULTURE

Relative to
 Cooperative Investigations on Chemical
 Methods of Analyzing Berry

Effective: April 10, 1930.

The object of this cooperative work is to determine chemical which are toxic to berry species and varieties known to be affected by the same root fungus, and to develop practical and economical methods of chemical analysis in the 13 north central states, namely, California, Illinois, Iowa, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin, and Wyoming. Laboratory headquarters for this work will be maintained at the University of California, Berkeley, California.

A. The Office of Berry Investigation agrees:

1. To assign to these investigations a member of the staff of the Office of Berry Investigation who shall be in direct charge of the work. All phases of the investigations shall be carried out with the full knowledge of the Office of Berry Investigation.
2. To plan and carry out a general survey of the field of berry investigation methods and to develop a program of research on chemical analysis.

3. To cooperate with all agencies concerned in the development of plans, if results of the above research warrant them, for chemical engineering studies of practical methods of applying chemical killing agents to barberries in the so-called barberry eradication area.

B. The Office of Barberry Eradication agrees:

1. To provide all information available on the taxonomy and ecology and culture of rust susceptible species, varieties and hybrids and to assist in making a general survey of the barberry eradication situation.
2. To pay the salaries and traveling expenses of employees engaged on barberry eradication studies.
3. To furnish the necessary chemicals, equipment and other supplies in connection with field, laboratory or greenhouse studies.

C. It is mutually agreed:

1. That general plans for the investigations shall be developed jointly by the proper officials of both cooperating agencies. Responsibility for the supervision and execution of the technical details of the work shall rest with the Office of Blister Rust Control.
2. That records of the results of field tests shall be secured jointly by representatives of the two offices involved. Duplicate copies of such experimental notes and records as may be mutually agreed shall be made, a copy to be supplied each cooperating agency. Such regular reports as may be mutually agreed upon shall be furnished the Office of Barberry Eradication.
3. That publications of results will be made as contributions from the Office of Barberry Eradication and may be joint or independent as may at the time be agreed upon by the cooperating agencies.
4. That the obligations of the Office of Barberry Eradication and the Office of Blister Rust Control are contingent upon appropriations being made by Congress from which expenditures may legally be met.
5. That all Government funds expended in connection with these investigations shall be disbursed in accordance with the fiscal regulations of the United States Department of Agriculture.

3. To cooperate with all agencies concerned in the development of plans, if results of the above research warrant them, for chemical engineering studies of practical methods of applying chemical milling agents to batteries in the so-called battery eradication area.

2. The Office of Battery Eradication shall:

1. To provide all information available on the battery and erosion and contents of road space, pipe, metal, vehicles and other and to assist in making a general survey of the battery eradication situation.

2. To pay the salaries and traveling expenses of employees engaged on battery eradication studies.

3. To furnish the necessary chemical, equipment and other supplies in connection with field, laboratory or greenhouse studies.

3. It is mutually agreed:

1. That general plans for the investigations shall be developed jointly by the project officials of both cooperating agencies, responsibility for the execution and execution of the investigation shall rest with the Office of Battery Eradication.

2. That records of the results of field tests shall be secured jointly by representatives of the two offices involved. Duplicate copies of such experimental notes and records as may be mutually agreed shall be made, a copy to be retained each cooperating agency. When further reports are mutually agreed upon, they shall be furnished the Office of Battery Eradication.

3. That publication of results will be made as contributions from the Office of Battery Eradication and may be joint or independent as may at the time be agreed upon by the cooperating agencies.

4. That the activities of the Office of Battery Eradication and the Office of Battery Control are contingent upon appropriations being made by Congress from which expenditures may legally be met.

5. That all government funds expended in connection with these investigations shall be disbursed in accordance with the fiscal regulations of the United States Department of Agriculture.

6. That the Office of Barberry Eradication will expend on these investigations approximately \$1,000 during the Fiscal Year 1930 and approximately \$6,500 during the Fiscal Year 1931. The Office of Blister Rust Control will contribute the facilities as specified under section A. The contributions will continue approximately as indicated for the Fiscal Year 1931. Changes in amount may be made by mutual agreement in advance of a Fiscal Year.

7. That no part of the money allotted to this work by the Office of Barberry Eradication shall be used to pay the cost or value of property injured or destroyed.

8. That this memorandum of understanding shall take effect April 15, 1930 to continue for an indefinite period and shall be subject to revision or termination by mutual consent of the parties concerned. Not less than ninety days notice of termination or any major change desired shall be given the other party to this agreement.

Date: 5/8/30

(s) S. B. Detwiler

Principal Pathologist in Charge, Office of Blister Rust Control.

Date: 4/18/30

(s) F. C. Meier

Principal Pathologist in Charge, Office of Barberry Eradication.

Date: 5/26/30

(s) Wm. A. Taylor

Chief, Bureau of Plant Industry

[illegible]

7. That no part of the money allotted to this work by the Office of Banking Regulation shall be used to pay the cost or value of property claimed or destroyed.

[illegible]

1. The first part of the document is a letter from the President of the United States to the Congress, dated January 3, 1862. It is a very long letter, and it contains a great deal of information about the state of the country at that time. It is a very important document, and it is one of the most interesting documents in the collection.

Date: _____
 (Signature) _____
 Principal, _____
 of _____

Case: 1:11-cv-00001 Document 1-1 Filed 07/11/11 Page 1 of 1

INTRODUCTION

In the spring of 1930 the Bureau of Plant Industry approved a plan whereby the Office of Blister Rust Control would cooperate with the Office of Barberry Eradication for the following purpose: to determine chemicals which are toxic to barberry species and varieties known to be alternate hosts of the black stem rust fungus, and to develop practical and economical methods of chemical eradication in the thirteen north central grain growing states. It is the belief of both cooperating agencies that the proposed work will be valuable on the one hand as a further test of experimental data obtained in the course of Ribes investigated and on the other as a means of utilizing a going research organization with a "modus operandi" already well established. Comprehensive field and laboratory experiments were planned.

As the preliminary step in this work Mr. D. Fletcher, Field Supervisor of the Barberry Office, conducted S. N. Wyckoff and the writer over typical (eradicated and non-eradicated) barberry areas in Wisconsin and Illinois. R. A. Caldwell and R. W. Mills, barberry leaders for Wisconsin and Illinois, mapped out the itinerary in their respective states. Following this, typical barberry sites in Ohio were visited with Dr. F. C. Meier, Chief of the Office of Barberry Eradication, and Mr. H. Atwood, state leader for Ohio. The prime object of this travel was to locate an area of barberries suitable for (1) a comprehensive test of chemicals on a permanent plot basis, and (2) collections of material for subsequent morphological and chemical laboratory investigations. While looking for a suitable area S. N. Wyckoff and the writer were enabled to familiarize themselves with (1) the various ecological forms of barberry, (2) methods now employed for eradication of barberry, and (3) regeneration of barberry (seedling and root sprouts) following initial eradication.

An areast Maumee, Ohio, some thirty acres in extent, finally was selected for the 1930 field experiments. This area was part of a 90-acre tract of land located 2½ miles southeast of Maumee on the Salisbury Road. The land was owned by the France Stone Company of Toledo, Ohio, and was under lease to L. H. Abel for pasture lands. Arrangements were made whereby two portions of the 90-acre tract were fenced off and retained for experimental purposes. In making arrangements for the use of the land and in subsequent experimental work, Mr. H. Atwood rendered valuable and timely assistance.

Printed by the Government Printer, Wellington.

In the spring of 1941 the Bureau of the FBI was advised by the Bureau of the Navy that the Bureau of the Navy was planning to conduct a series of experiments in the use of the "radio" in the field. The Bureau of the FBI was interested in the results of these experiments and requested that the Bureau of the Navy furnish the Bureau of the FBI with a copy of the report of the results of these experiments. The Bureau of the Navy was unable to furnish the Bureau of the FBI with a copy of the report of the results of these experiments. The Bureau of the FBI was advised that the Bureau of the Navy was planning to conduct a series of experiments in the use of the "radio" in the field. The Bureau of the FBI was interested in the results of these experiments and requested that the Bureau of the Navy furnish the Bureau of the FBI with a copy of the report of the results of these experiments. The Bureau of the Navy was unable to furnish the Bureau of the FBI with a copy of the report of the results of these experiments.

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work, and a good record, valuable and timely assistance
arrangements for the use of the land and in subsequent experimental
tened off and retained for experimental purposes. In 1912
thousands were made through the purchase of the 50-acre tract near
Tulsa, Okla., and was under lease to the U. S. Dept. for various kinds
of laboratory work. The land was owned by the United States Company of
a 50-acre tract of land located 2 1/2 miles southeast of Tulsa on the
was selected for the 1913 field experiment. This area was part of
An area of 100 acres, also, some thirty acres in extent, finally

SUMMARY OF EXPERIMENT IS CONDUCTED AT MAUMEE, OHIO DURING 1950 SEASON

In planning the field experiments on barberry, advantage was taken of the several years' experience with hives by selecting certain key chemicals which had proved representative of distinct types of killing action. These chemicals were to be tested: (1) as a spray, (2) as a crown application in liquid form, and (3) as a crown application in solid form. Sprays were to be tested at various pH values, and in so far as compatible with the late start, the seasonal effect was to be noted for these key chemicals. After a thorough discussion of the whole problem with Dr. Meier who pointed out the desirability for a practicable chemical method for the eradication of barberry from private properties, a series of injection experiments were planned. The prime purpose of these experiments was to develop a method whereby a small amount of chemical might be specifically applied to barberry in such a way that adjacent plants would not suffer, the soil remain fertile, and the landscape be disfigured to a minimum extent.

On June 10, G. W. Draper and A. E. Hingate reported at Toledo, Ohio for field work on the experimental area at Maumee, Ohio. The writer stayed at Maumee until June 24 assisting in the organization of the work. By July 10 two experimental areas (hereafter recorded as Area 1 and Area 2) had been fenced, the fenced areas marked off into permanent plots two rods square and the barberries on each individual plot counted and marked. Stake heads were painted white, plot symbols were lettered in black on the south face of each stake, and experimental data for each plot were lettered on the key stake at the southwest corner of each plot. Entries on these maps refer to spray experiments.

Spraying experiments were aimed primarily against seedlings and small bushes, though a fair sample of larger bushes was included in all tests. Crown applications were made with large bushes in mind; injection experiments were also chiefly concerned with the larger bushes. Barberries tested by spray application were marked by means of a short length of white cheesecloth tied about a stem. Bushes used for crown application experiments were numbered consecutively from 1 to 109 and marked and labeled with half a strip of Indestructo metal tied to a stem. Each bush so treated was further marked by a wire stake to which a piece of white cheesecloth was tied. Injection experiments were marked similarly to crown application and were numbered from 110 to 171. In most cases two or more bushes were tested by each of the experiments listed under crown application and stem injection. Six plots were selected in Area 2 as check plots. These plots were located in different parts of the area so chosen as to be representative of the various conditions of soil and temperature which were encountered in the course of the chemical tests.

Sprays were applied with the five-gallon backpack sprayer developed by the Office of Blister Rust Control for general field work.

This report presents a brief summary of the work done during the past year. It is divided into two main parts: a general summary of the work done and a detailed account of the results of the various experiments. The general summary is given in Table I, and the detailed account is given in Table II. The results of the experiments are given in Table III.

The first part of the report is a general summary of the work done. It is divided into two main parts: a general summary of the work done and a detailed account of the results of the various experiments. The general summary is given in Table I, and the detailed account is given in Table II. The results of the experiments are given in Table III.

The second part of the report is a detailed account of the results of the various experiments. It is divided into two main parts: a general summary of the work done and a detailed account of the results of the various experiments. The general summary is given in Table I, and the detailed account is given in Table II. The results of the experiments are given in Table III.

The third part of the report is a detailed account of the results of the various experiments. It is divided into two main parts: a general summary of the work done and a detailed account of the results of the various experiments. The general summary is given in Table I, and the detailed account is given in Table II. The results of the experiments are given in Table III.

The fourth part of the report is a detailed account of the results of the various experiments. It is divided into two main parts: a general summary of the work done and a detailed account of the results of the various experiments. The general summary is given in Table I, and the detailed account is given in Table II. The results of the experiments are given in Table III.

The fifth part of the report is a detailed account of the results of the various experiments. It is divided into two main parts: a general summary of the work done and a detailed account of the results of the various experiments. The general summary is given in Table I, and the detailed account is given in Table II. The results of the experiments are given in Table III.

The sixth part of the report is a detailed account of the results of the various experiments. It is divided into two main parts: a general summary of the work done and a detailed account of the results of the various experiments. The general summary is given in Table I, and the detailed account is given in Table II. The results of the experiments are given in Table III.

The seventh part of the report is a detailed account of the results of the various experiments. It is divided into two main parts: a general summary of the work done and a detailed account of the results of the various experiments. The general summary is given in Table I, and the detailed account is given in Table II. The results of the experiments are given in Table III.

TABLE NO. 1

CHEMICALS TESTED AS SPRAYS AND CROWN APPLICATIONS TO COMMON BARBERY, MAJUMEL PLOTS, 1930

| Date of Experiment | Chemical Used | Method of Application | Applied to Plots |
|--------------------|------------------------------------|----------------------------|--|
| July 13, 1930 | Copper Complex | Spray | Area 1, (0-3)A, OB, 4A, 4B |
| July 21, 1930 | Copper Complex | Spray | Area 1, (1-3)B, 2C |
| July 21, 1930 | Zinc Ammonium Chloride | Spray | Area 1, 3C, 3D |
| July 21, 1930 | Sodium Tetraborate | Spray | Area 1, 4E |
| July 21, 1930 | Ammonium Chloride | Spray | Area 1, 5E |
| July 21, 1930 | Sulphuric Acid | Spray | Area 1, 6F |
| July 24, 1930 | Sodium Chlorate | Spray | Area 1, 1C, 1D, 2D, 1E |
| July 28, 1930 | Sodium Chlorate | Spray | Area 1, 9C, 2F, 1F, 2D |
| July 24, 1930 | Sodium Chlorate | Spray | Area 2, 20G, 20H |
| July 24, 1930 | Attlacide | Spray | Area 2, 19H, 19H2 |
| July 28, 1930 | Attlacide | Spray | Area 2, 17H, 17E, 17F, 16E, 16F, 16G |
| July 28, 1930 | Pitch Oil + Pyridene | Spray | Area 2, 17G, 14H, 15I |
| July 28, 1930 | Sodium Hydroxide | Spray | Area 2, 16J |
| July 28, 1930 | Pitch Oil + Purfural | Spray | Area 2, 18I |
| July 28, 1930 | Pitch Oil + Cresylic Acid | Spray | Area 2, 14F, 15F |
| July 28, 1930 | Pitch Oil + Phenol | Spray | Area 2, 13G, 14G |
| July 29, 1930 | Sodium Chlorate | Crown Application Solution | Area 2, (6-14)A |
| July 29, 1930 | Sodium Chlorate | Crown Application Solid | Area 2, 7A |
| July 29, 1930 | Attlacide | Crown Application Solid | Area 2, 6A |
| July 30, 1930 | Attlacide | Crown Application Solution | Area 2, 5A, 6A, OB, 1B, 2B |
| July 30, 1930 | Pitch Oil | Crown Application | Area 2, 2B, 3B |
| July 30, 1930 | Pitch Oil + Pyridene | Crown Application | Area 2, 4B, 5B |
| July 30, 1930 | Pitch Oil + Cresylic Acid | Crown Application | Area 2, (6-7)B |
| July 31, 1930 | Pitch Oil + Phenol | Crown Application | Area 2, (9-16)B |
| July 31, 1930 | Zinc Ammonium Chloride | Crown Application Solution | Area 2, 14E, 7C, 8C, 10C, 13C |
| July 31, 1930 | Copper Complex | Crown Application Solution | Area 2, (1-5)C, 5C, 6C |
| July 31, 1930 | Copper Complex | Crown Application Solid | Area 2, 9C, 1D |
| July 31, 1930 | Zinc Ammonium Chloride | Crown Application Solid | Area 2, 2D, 4D, 5D |
| August 1, 1930 | Sodium Fluoride + Sodium Chloride | Crown Application Solution | Area 2, 9D, (11-13)D |
| August 1, 1930 | Sodium Fluoride + Sodium Hydroxide | Crown Application Solution | Area 2, 13D |
| August 1, 1930 | Attlacide | Crown Application Solid | Area 2, 2E |
| August 1, 1930 | Sodium Fluoride + Sodium Hydroxide | Crown Application Solid | Area 2, (5-7)E |
| August 4, 1930 | Ammonium Chloride | Crown Application Solid | Area 2, 12E, 13E, 13F, 12F, (7-9)F |
| August 15, 1930 | Kerosene | Spray | Area 2, 14D |
| August 15, 1930 | Kerosene + Phenol | Spray | Area 2, 14D |
| August 15, 1930 | Pitch Oil | Spray | Area 2, 15D |
| August 16, 1930 | Pitch Oil + Pyridene | Spray | Area 2, 2M, 3M |
| August 16, 1930 | Pitch Oil + Purfural | Spray | Area 2, 6L |
| August 16, 1930 | Pitch Oil + Cresylic Acid | Spray | Area 2, 8E, 8G |
| August 18, 1930 | Sodium Chlorate | Spray | Area 2, 2F |
| August 19, 1930 | Sodium Chlorate | Spray | Area 2, (0-7)M, (0-4)L, (0-4)K, (0-3)J, (4-7)N, 5O |
| August 20, 1930 | Sodium Chlorate | Spray | Area 2, 16E, 19G |
| August 21, 1930 | Sodium Chlorate | Spray | Area 2, 16G |
| August 22, 1930 | Attlacide | Spray | Area 2, 16F, 16F2 |
| August 23, 1930 | Attlacide | Spray | Area 2, 17I, 3K, 5L, 16H |
| August 24, 1930 | Copper Complex | Spray | Area 2, 16I, 18E, 14E, 18C, 15G |
| August 25, 1930 | Copper Complex | Spray | Area 2, 13(A-D), 14(A-C), 15B, 12(A-G), 13F, 11A, 15J, 13H, 12H, 11G, 11H, 10G, 9G |
| August 25, 1930 | Sulphuric Acid | Spray | Area 2, 9H, 10H |
| August 25, 1930 | Sodium Hydroxide | Spray | Area 2, 7H |
| August 26, 1930 | Zinc Ammonium Chloride | Spray | Area 2, (4-6)J, 5I, 6I, 5H, 6H, (0-3)H, (0-3)I, (0-7)G, (0-5)F |
| August 27, 1930 | Sodium Tetraborate | Spray | Area 2, (6-11)F, (B-E)11, 10A, 10B |
| August 27, 1930 | Pitch Oil + Phenol | Spray | Area 2, 10C, 10D, (A-E)9, 6A, 6B |
| August 27, 1930 | Sodium Chlorate | Spray | Area 2, (A-E)6, (A-E)5, 4E, 4D, (A-C)4, (A-E)3, (A-E)2, (A-E)1, (C-2)C |
| August 27, 1930 | Attlacide | Dusted On | Area 2, 0E |

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H. B. Offord



A LIST OF PLANTS OF BARBERY PLANTS

TABLE NO. 2

BERBERIS VULGARIS. COLLECTIONS SUMMARY

| Serial Number | Date Collected | Portions of Plant Collected | To Be Used for |
|---------------|-------------------------|---|------------------------|
| pH (1-4) | 7/15/30 | Leaves, current stems, old stems and roots | pH determination |
| P (1-3) | 7/15/30 | Leaves, old stems, roots | Proximate analysis |
| T (1-4) | 7/15/30 | Leaves, current stems, old stems and roots | Tannin analysis |
| H (1-3) | 7/18/30 | Leaves, stems, roots and seedlings | Morphological work |
| pH (5-8) | 8/4/30 | Leaves, current stems, old stems and roots | pH determination |
| pH (9-12) | 8/26/30 | Leaves, current stems, old stems and roots | pH determination |
| T (5-8) | 8/29, 9/30, 9/2, 9/3/30 | Leaves, current stems, old stems and roots | Tannin analysis |
| - | 9/7/30 | Barberry seedlings (2,000) and supply of fruits | Greenhouse propagation |

Rubus saxatilis Ehrh.

Rubus nigra Ait.

Rubus ulmifolius L.

TABLE NO. 3

Barberry
Canada, Ont.
Honey Locust

PH DETERMINATIONS ON BARBERY PLANTS 1930*

| Material | Date Specimens Taken | | |
|--------------------|----------------------|----------|-----------|
| | July 17 | August 5 | August 30 |
| <u>Leaves</u> | | | |
| sap expressed** | 20.8 | 24.0 | 21.2 |
| pH | 3.02 | 3.03 | 2.93 |
| <u>Young stems</u> | | | |
| sap expressed | 13.3 | 3.6 | 0.0 |
| pH | 4.94 | 4.66 | - |
| <u>Old stems</u> | | | |
| sap expressed | 7.8 | 0.0 | 4.6 |
| pH | 5.09 | - | 4.62 |
| <u>Roots</u> | | | |
| sap expressed | 7.6 | 0.0 | 13.8 |
| pH | 3.26 | - | 2.13 |

Rubus flagellaria Willd.

Method: All tissues ground and sap expressed under a pressure of 2,500 pounds per sq. in. pH determination with quinhydrone electrode.

*Work done by Dr. B. S. Meyer of Ohio State University.

**CC. per 100 gms. tissue.

TABLE NO. 2

SERRIS TRENTS. COLLECTOR TRENTS

| Serial Number | Date Collected | Portions of Plant Collected | To Be Used for |
|---------------|-------------------|---|----------------------|
| PH (1-4) | 7/15/30 | Leaves, current stems, old stems and roots | pH determination |
| P (1-2) | 7/15/30 | Leaves, old stems, roots | Physiologic analysis |
| T (1-4) | 7/15/30 | Leaves, current stems, old stems and roots | Tannin analysis |
| E (1-2) | 7/15/30 | Leaves, stems, roots and seedlings | Morphological work |
| PH (3-8) | 8/4/30 | Leaves, current stems, old stems and roots | pH determination |
| PH (9-12) | 8/26/30 | Leaves, current stems, old stems and roots | pH determination |
| T (2-4) | 8/29/30
8/2/31 | Leaves, current stems, old stems and roots | Tannin analysis |
| - | 9/9/30 | Harvest seedlings (2,000) and supply of fruit | Physiologic analysis |

TABLE NO. 3

H-ION DETERMINATIONS ON HERRERY PLANTS 1930*

| Material | Date Specimens Taken | | |
|-----------------|----------------------|----------|-----------|
| | July 17 | August 2 | August 30 |
| Leaves | | | |
| sap expressed** | 30.8 | 24.0 | 31.2 |
| pH | 3.02 | 3.02 | 2.72 |
| Young stems | | | |
| sap expressed | 17.2 | 2.6 | 0.0 |
| pH | 4.24 | 4.68 | - |
| Old stems | | | |
| sap expressed | 7.8 | 0.0 | 4.6 |
| pH | 5.02 | - | 4.2 |
| Roots | | | |
| sap expressed | 9.6 | 0.0 | 12.8 |
| pH | 5.28 | - | 5.12 |

Method: All tissues ground and sap expressed under a pressure of 2,500 pounds per sq. in. pH determination with glass electrode.
*Data from Dr. B. S. Peter of Ohio State University.
**CC. per 100 gms. tissue.

A LIST OF PLANTS ON MAUMEE EXPERIMENTAL AREA

OHIO

TREES

Thuja occidentalis L.
Juniper virginiana L.
Salix sp.
Populus tremuloides Michx.
Populus deltoides Marsh.
Malus sp. *laevigata* Fernald.
Crataegus sp.
Juglans nigra L.
Carya sp.
Carpinus caroliniana Walt.
Quercus alba L.
Quercus bicolor Willd.
Quercus muhlenbergii Engelm.
Quercus palustris Muench.
Quercus velutina Lam.
Quercus imbricaria Michx.
Ulmus americana L.
Celtis occidentalis L.
Sassafras verifolium (Salisb.) Ktze.
Plantanus occidentalis L.
Amelanchier canadensis (L.) Medic.
Prunus serotina Ehrh.
Prunus nigra Mill.
Cleditea trichanthos L.
Acer sp.
Cornus sp. *paniculata* (L.) Pers.
Fraxinus sp. *lanceolata* (Vahl.)
Viburnum lentago L.

SHRUBS

Saxifraga virginica L.
Rubus occidentalis L.
Saxifraga hirsuta Muhlenberg Mill.
Salix sp.
Corylus americana Walter & was identified as
Ribes cynosbati (Linnaeus) Miller
Hammamelis virginiana L.
Physocarpus opulifolius (L.) Maximowicz
Spiraea tomentosa L.F. J. M. Field Manual
Spiraea alba Dukoi
Rubus occidentalis L.
Rubus flagellaris Willdenow
Rubus allegheniensis Porter
Rosa setigera Michaux
Rosa sp.
Aronia melanocarpa (Michaux) Elliott

Common Trees

Red Cedar
Willow
Aspen
Cottonwood
Crab Apple
Hawthorn, two species at least
Black Walnut
Hickory, at least two species
Blue Beech
White Oak
Swamp White Oak
Chinquapin Oak
Pin Oak
Yellow Oak
Shingle Oak
White Elm
Hackberry
Sassafras
Lycamore
Serviceberry
Black Cherry
Canada Plum
Money Locust
Asple
Dogwood
Ash
Shepherdia

Common Shrubs

Hispid Greenbrier
Willow
American Hazelnut
Pasture Gooseberry
Common Titce-hazel
Common Ninebark
Hardhack
Meadow Spiraea
Common Blackcap Raspberry
Northern Dewberry
Allegheny Blackberry
Prairie Rose
Rose
Black Chokeberry

A LIST OF PLANTS ON MAJOR RIVERS AND LAKE

Ohio

1870-1871

TREES

Liquidambar styraciflua L.

Salix sp.

Populus tremuloides Michx.

Populus balsamifera L.

Salix sp.

Crataegus sp.

Ulmus alatus L.

Salix sp.

Corylus americana Michx.

Fraxinus sp.

Quercus alba L.

Quercus macrocarpa (Michx.) B.S.P.

Quercus prinus L.

Quercus velutina Lam.

Quercus laevis (DuRoi) Robt.

Quercus macrocarpa (Michx.) B.S.P.

Quercus prinus L.

Quercus velutina Lam.

Quercus laevis (DuRoi) Robt.

Quercus macrocarpa (Michx.) B.S.P.

Quercus prinus L.

Quercus velutina Lam.

Quercus laevis (DuRoi) Robt.

Quercus macrocarpa (Michx.) B.S.P.

Quercus prinus L.

Quercus velutina Lam.

Quercus laevis (DuRoi) Robt.

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Quercus macrocarpa (Michx.) B.S.P.

Quercus prinus L.

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Quercus prinus L.

Quercus velutina Lam.

Quercus laevis (DuRoi) Robt.

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Quercus macrocarpa (Michx.) B.S.P.

Quercus prinus L.

Quercus velutina Lam.

Quercus laevis (DuRoi) Robt.

Quercus macrocarpa (Michx.) B.S.P.

Quercus prinus L.

Quercus velutina Lam.

Quercus laevis (DuRoi) Robt.

SHRUBS

Salix alba L.

Salix sp.

Corylus americana Michx.

Alnus incana (L.) Mill.

Rhamnus virginiana L.

Opuntia aculeata (L.)

Maximiliania

Alnus incana (L.)

Alnus sp.

Alnus sp.

Alnus sp.

Alnus sp.

Alnus sp.

Alnus sp.

Alnus sp.

Alnus sp.

Alnus sp.

Alnus sp.

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Alnus sp.

Alnus sp.

Alnus sp.

Alnus sp.

Alnus sp.

Alnus sp.

Alnus sp.

Alnus sp.

Alnus sp.

Black Chokeberry

SHRUBS (Continued)

Scientific Classification
Naturalized Species

Zanthoxylum americanum Miller
Rhus copallina L.
Rhus glabra L.
Rhus canadensis Marshall
Rhus radicans L.
Celastrus scandens L.
Rhamnus lanceolata Pursh.
Vitis sp.
Parthenocissus sp.
Cornus sp.
Caultheria procumbens L.
Gaylussacia baccata K. Koch
Vaccinium vacillans Kalm ex
Torrey
Cephalanthus occidentalis
Viburnum affine Bush
Berberis vulgaris L.

Common Prichly-ash
Shining Sumac
Smooth Sumac
Fragrant Sumac
Poison Ivy
American Bittersweet
Lance-leaved Buckthorn
Grape, at least two species
Virginia Creeper
Dogwood
Wintergreen
Black Huckleberry
Dryland Blueberry
Common Buttonbush
Missouri Viburnum
European Barberry

HERBS

Scientific Classification
Naturalized Species

Steironema quadriflorum (Sims)
Hitchc.
Oenothera oakesiana
Verbascum blattaria L.
Verbascum thapsus L.
Agalinis purpurea (L.) Penn.
Agalinis tenuifolia (Vahl.)
Raf.
Verbena hastata L.
Prunella vulgaris L.
Fluchea petiolata Cass.
Cirsium lanceolatum (L.) Hill

Linear-leaf Yellow Loosestrife
Oakes' Evening Primrose
Moth Mullen
Common Mullen
Large-flowered Agalinis
Slender Agalinis
Blue Vervain
Common Self-heal
Inland Marsh-fleabane
Spear Thistle

The above list was classified at odd times during the work on the experimental area and is not an attempt at a list in any way complete, but does serve to give some idea of the vegetation in the region where the work was done. References used were:

- Schaffner, J. H., Field Manual of the Flora of Ohio and Adjacent Territory. 1928. E. G. Adams & Co., Columbus, Ohio.
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1997

1915-1916

(S) 10/17/68

no more and I wish to tell him so. He has no more to do with me. I have told him so.

[illegible]

TABLE NO. 4

INJECTION EXPERIMENTS UNDERTAKEN AT MAUMEE, OHIO. AUGUST-SEPTEMBER 1930

| Chemical Used | Treatment Given | Bush Number |
|---------------------------|-----------------|---------------|
| Sodium Chlorate | 2 | 160, 161, 165 |
| Water Paste | 5 | 162, 163 |
| | 1 | 164 |
| Sodium Chlorate | 6 | 166, 169 |
| Saturated Solution | | |
| Arsenic Oxide | 5 | 170 |
| Water Paste | 2 | 171 |
| | 4 | 172 |
| Arsenic Oxide | 6 | 167, 168 |
| Saturated Solution | | |
| Bismuth Subbenzoate | 2 | 173 |
| Glycerine Paste | 4 | 174 |
| | 1 | 175 |
| | 5 | 176 |
| Sodium Cyanide | 4 | 177 |
| Glycerine Paste | 1 | 180 |
| | 2 | 182 |
| | 5 | 183 |
| | 7 | 184 |
| Sodium Cyanide | 3 | 178, 181 |
| Saturated Solution | 6 | 179 |
| Copper Complex | 2 | 186 |
| Glycerine Paste | 4 | 187 |
| | 1 | 188, 191 |
| | 5 | 192 |
| Copper Complex | 3 | 185, 189 |
| Saturated Solution | 6 | 190, 197 |
| Atiacide | 1 | 193, 200 |
| Glycerine Paste | 7 | 203, 204 |
| Copper Complex | 7 | 194, 195 |
| Glycerine Paste | 5 | 196 |
| | 4 | 198 |
| | 2 | 199 |
| | 6 | 205 |
| Sulphur Dioxide | | |
| Solution 8% | | |
| Zinc Ammonium Chloride | 5 | 206, 209 |
| Glycerine Paste | 4 | 210 |
| | 2 | 211 |
| | 1 | 212 |
| | 7 | 213 |
| Sodium Sulphate | 3 | 264, 265 |
| Saturated Solution | 6 | 268, 269 |
| Kerosene | 2 (6 cc. Used) | 278 |
| No Glycerine | 1 (5 cc. Used) | 279, 280 |
| | 2 (20 cc. Used) | 281 |
| | 3 | 282 |
| Ferrous Ammonium Sulphate | 4 | 283, 287 |
| Glycerine Paste | 5 | 284, 285 |
| | 2 | 286, 290 |
| | 1 | 291, 292 |
| | 7 | 295, 296 |
| Ferrous Ammonium Sulphate | 3 | 288, 289 |
| Saturated Solution | 6 | 293, 294 |
| Pitch Oil | 3 | 297, 301 |
| No Glycerine | 4 | 296, 299 |
| | 2 | 300, 302 |
| | 1 | 303, 304 |
| Sodium Chlorate | 2 | 305, 306 |
| Water Paste | 7 | 307, 308 |
| Sodium Chlorate | 3 | 309, 310 |
| Saturated Solution | 6 | 311 |
| Sodium Chlorate | 2 | 312, 314 |
| Glycerine Paste | 5 | 313 |
| | 1 | 315, 316, 319 |
| | 4 | 317, 318 |
| Formaldehyde | 3 | 320, 321 |
| No Glycerine | 1 | 322, 323 |
| | 4 | 324 |
| | 4 | 325 |
| Sodium Chloride | 1 | 326, 329 |
| Glycerine Paste | 5 | 330, 331 |
| | 4 | 332, 333 |
| | 2 | 334, 335 |
| Sodium Chloride | 6 | 336, 337 |
| Saturated Solution | 3 | 338, 337 |

| Chemical Used | Treatment Given | Bush Number |
|------------------------------------|-----------------|-------------|
| Silver Nitrate | 4 | 218 |
| Glycerine Paste | 2 | 219 |
| Silver Nitrate | 6 | 220 |
| Saturated Solution | | |
| Purpural | 3 | 221, 222 |
| | 6 | 223 |
| | 1 | 224 |
| | 5 | 225 |
| Copper Sulphate | 7 | 228, 229 |
| Glycerine Paste | 1 | 230, 232 |
| | 5 | 231 |
| | 4 | 233 |
| | 2 | 234 |
| Copper Sulphate | 3 | 236, 227 |
| Saturated Solution | 6 | 235 |
| Sodium Nitroprusside | 4 | 236, 238 |
| Glycerine Paste | 1 | 237 |
| | 5 | 239 |
| | 7 | 242 |
| Sodium Nitroprusside | 3 | 240 |
| Saturated Solution | 6 | 241 |
| Sodium Nitrite | 5 | 243 |
| Glycerine Paste | 2 | 245 |
| | 4 | 246 |
| | 1 | 247 |
| | 7 | 249 |
| Sodium Nitrite | 6 | 244 |
| Saturated Solution | 3 | 248 |
| Mercuric Chloride | 5 | 252, 256 |
| Glycerine Paste | 1 | 253, 261 |
| | 4 | 254, 258 |
| | 2 | 257, 259 |
| | 7 | 262, 263 |
| Mercuric Chloride | 3 | 250, 251 |
| Saturated Solution | 6 | 255, 260 |
| Sodium Sulphate | 7 | 266, 267 |
| Glycerine Paste | 5 | 270, 272 |
| | 1 | 271, 273 |
| | 2 | 274, 277 |
| | 4 | 275, 276 |
| Phenol | 4 | 338 |
| Glycerine Liquid | 3 | 340 |
| | 5 | 341 |
| | 2 | 342 |
| | 1 | 344 |
| Phenol + Water | 3 | 339 |
| Saturated Solution | 6 | 343 |
| Potassium Dichromate | 1 | 349 |
| Glycerine Paste | 5 | 346 |
| | 4 | 347 |
| | 2 | 348 |
| Potassium Dichromate | 6 | 345 |
| Saturated Solution | | |
| Cadmium Chloride | 5 | 350, 353 |
| Glycerine Paste | 1 | 351 |
| | 4 | 353 |
| | 2 | 355 |
| Cadmium Chloride | 3 | 352 |
| Saturated Solution | 6 | 354 |
| Ammonium Chloride | 4 | 356 |
| Glycerine Paste | 1 | 357, 361 |
| | 2 | 360 |
| Ammonium Chloride | 3 | 358 |
| Saturated Solution | 6 | 362 |
| Sodium Tetraborate | 5 | 366 |
| Glycerine Paste | 2 | 368 |
| | 1 | 369 |
| | 4 | 370 |
| Sodium Fluoride | 5 | 365 |
| Glycerine Paste | 1 | 366 |
| | 2 | 367 |
| | 4 | 369 |
| Phenol in Kerosene | See Spray | 370 |
| | Chart | 371 |
| Sodium Chlorate Saturated Solution | 6 | 372 |

LEGEND FOR TREATMENT GIVEN

1. Bush cut off through crown, groove cut in crown, filled with paste. (1-5 gms.)
2. Bush cut off through crown, hole bored with 3/16" bit and filled with paste. (1-5 gms.)
3. Crown lacerated and large roots exposed, small amount of saturated solution (2-4 cc.) applied.
4. Top left intact, hole bored into crown and filled with a paste. (1-5 gms.)
5. One stem cut off at crown, groove cut in crown and filled with a paste. (1-5 gms.)
6. One stem cut off, fitted on a piece of rubber tubing and rubber tubing filled with a saturated solution. (5-20 cc.)
7. Grubbed out the crown and applied paste to ends of roots. (5-20 gms.)

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| | | | | | |
|--|--|--|--|--|--|
| 4-A
Copper Complex
2.6# per gallon
Glue .01% pH 6.5
.39 gal.
1 Large | 4-B
See 4-A
3 Large | 3-C
Zinc Ammonium Chloride
2.7# per gallon
pH as dissolved
.75 gal.
15 Large
Total Bushes This Spray | 3-D
See 3-C | 2-E
Sodium Tetraborate
Saturated solution
pH as dissolved
.39 gal.
15 Large | 2-F
Sodium Chlorate
2.7# per gallon
Glue .01%
pH 6.5
4.5 gal.
72 Large; 1 Small
See Plot O-C
O Large |
| 3-A
Copper Complex
3.1# per gallon
Glue .01%
Glycerine 2.5%
pH 6.5
.13 gal.
2 Large | 3-B
Copper Complex
3.1# per gallon
Glue .01%
Glycerine 2.5%
pH 6.5
.13 gal.
13 Large | 3-C
Zinc Ammonium Chloride
2.7# per gallon
pH as dissolved
.75 gal.
15 Large
Total Bushes This Spray | 3-D
See 3-C | 2-E
Sodium Tetraborate
Saturated solution
pH as dissolved
.39 gal.
15 Large | 2-F
Sodium Chlorate
2.7# per gallon
Glue .01%
pH 6.5
4.5 gal.
72 Large; 1 Small
See Plot O-C
O Large |
| 2-A
Copper Complex
2.6# per gallon
Glue .01%
Glycerine 2.5%
pH 6.5
2.75 gal.
12 Large | 2-B
Copper Complex
3.1# per gallon
Glue .01%
Glycerine 2.5%
pH as dissolved
.91 gal.
14 Large | 2-C
Copper Complex
3.1# per gallon
Glue .01%
pH 6.5
.75 gal.
23 Large; 2 Small | 2-D
Sodium Chlorate
.89# per gallon
Glue .01%
pH 6.5
1.25 gal.
33 Large; 3 Small | 2-E
Sodium Tetraborate
Saturated solution
pH as dissolved
.39 gal.
15 Large | 2-F
Sodium Chlorate
2.7# per gallon
Glue .01%
pH 6.5
4.5 gal.
72 Large; 1 Small
See Plot O-C
O Large |
| 1-A
Copper Complex
2.6# per gallon
Glue .01%
Glycerine 2.5%
pH as dissolved
.75 gal.
22 Large | 1-B
Copper Complex
3.1# per gallon
Glue .01%
pH as dissolved
.71 gal.
13 Large; 1 Small | 1-C
Sodium Chlorate
.89# per gallon
Glue .01%
pH 6.5
3 gal.
44 Large; 2 Small | 1-D
Sodium Chlorate
.89# per gallon
Glue .01%
pH 6.5
3.38 gal.
45 Large; 6 Small | 1-E
Sodium Chlorate
2.7# per gallon
Glue .01%
pH 4.0
2.5 gal.
66 Large; 14 Small | 1-F
Sodium Chlorate
2.7# per gallon
Glue .01%
pH 6.5
4.5 gal.
72 Large; 1 Small
See Plot O-C
O Large |
| 0-A
Copper Complex
2.6# per gallon
Glue .01%
Glycerine 2.5%
pH as dissolved
.75 gal.
13 Large | 0-B
Copper Complex
2.6# per gallon
Glue .01%
pH 6.5
.63 gal.
13 Large | 0-C
Sodium Chlorate
2.7# per gallon
Glue .01%
pH 6.0
4.44 gal.
21 Large | 0-D
Sodium Chlorate
.89# per gallon
Glue .01%
pH 4.0
4.26 gal.
34 Large; 4 Small | 0-E
Ammonium Chloride
2.7# per gallon
pH as dissolved
1.23 gal.
18 Large | 0-F
Sulphuric Acid
.35# per gallon
.1% (approx.)
pH as dissolved
1.56 gal.
22 Large
Total Bushes This Spray
See
O-F |

BARBERRY CHEMICAL EXPERIMENTAL AREA I

SCALE 1" = 1/2' 1" = 1 CHAIN
MAUMEE, OHIO
ORIGINAL MAP BY DRAPER, SEPT. 27, 1930
COPY BY W. V. B., OCT. 17, 1930

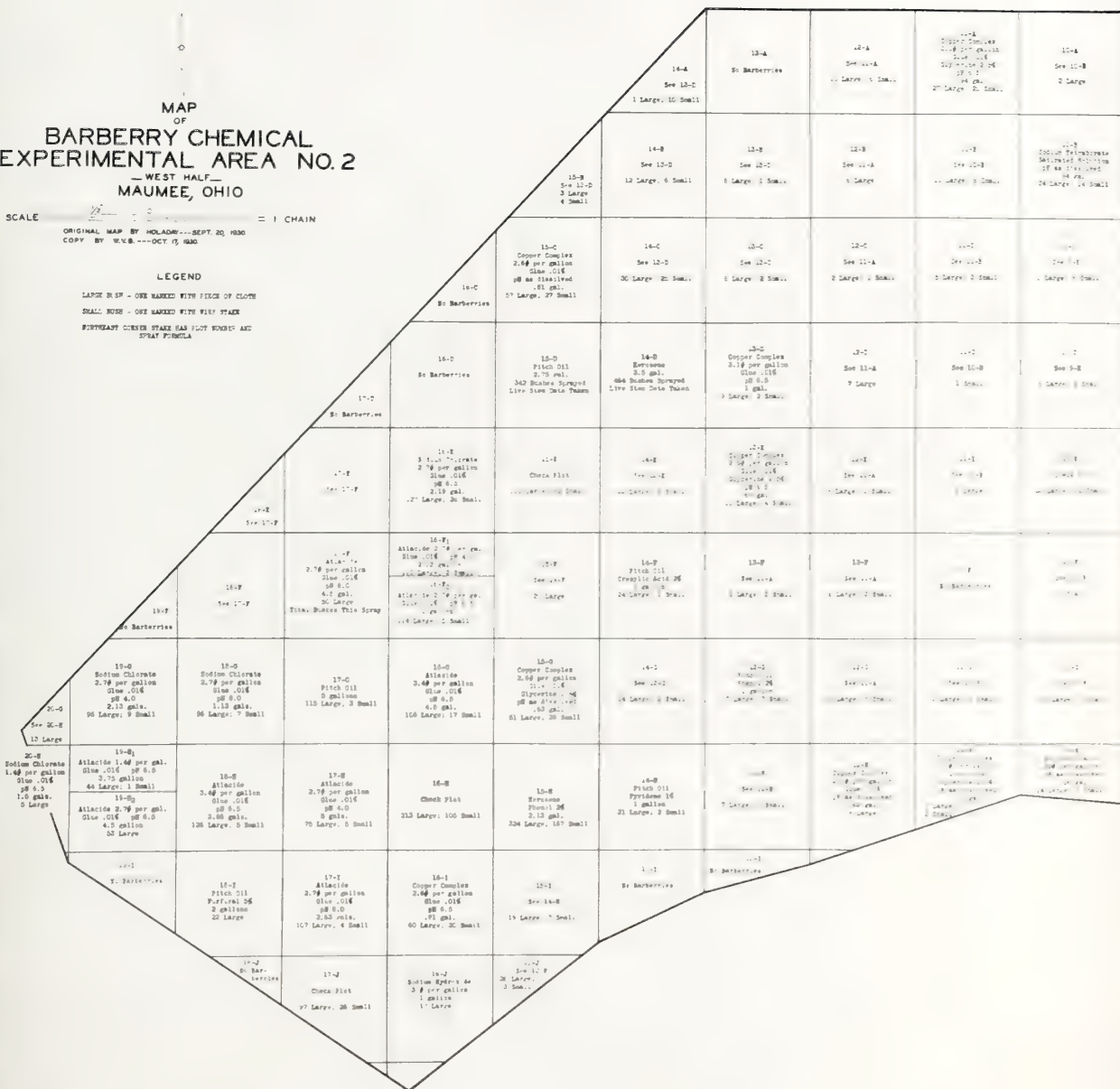
LEGEND
LARGE BUSH - ONE MARKED WITH PIECE OF CLOTH
SMALL BUSH - ONE MARKED WITH WIRE STAKE
SOUTHWEST CORNER STATE HAS PLOT NUMBER AND
SIBAT FORMULA

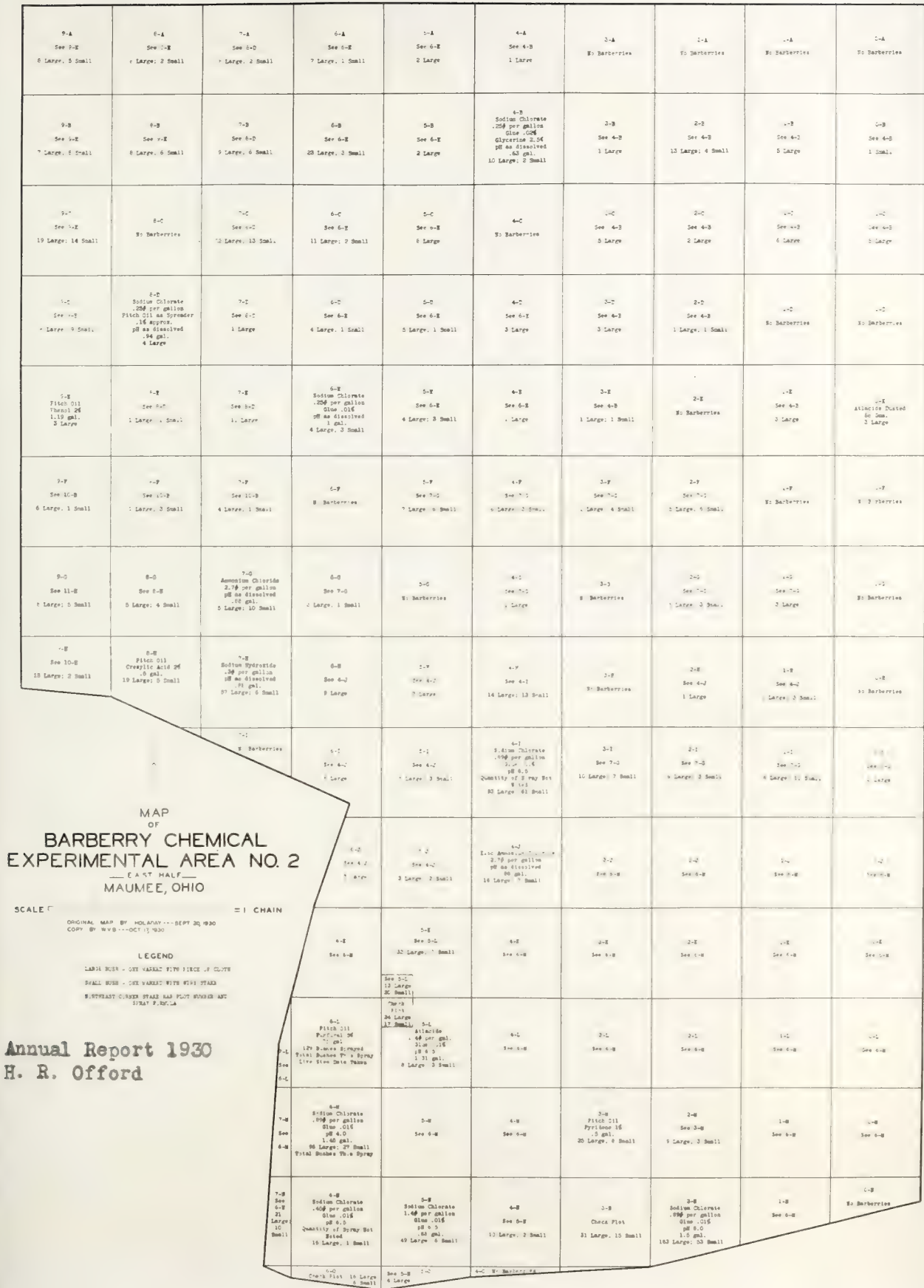
MAP OF BARBERRY CHEMICAL EXPERIMENTAL AREA NO. 2 — WEST HALF — MAUMEE, OHIO

SCALE $\frac{1}{2}$ IN. = 1 CHAIN
ORIGINAL MAP BY HOLADAY---SEPT. 20, 1930
COPY BY W.V.B.---OCT. 15, 1930

LEGEND

LARGE IN SP - ONE MARKED WITH FEEDS OF CLOVE
SMALL IN SP - ONE MARKED WITH FEEDS OF STAGE
FERTILIZER CENTER STAGE HAS FEEDS BOWED AND
STRAIT FERTILIZER





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TENTATIVE CONCLUSIONS DRAWN FROM OBSERVATIONS OF FIELD EXPERIMENTS

Common barberry appears to be rather susceptible to three types of chemical treatment and lends itself, if these observations are finally proved to be true, to a flexible program of chemical eradication. The following chemical methods are tentatively suggested:

1. For eradication of mature plants where they occur in great numbers: Sodium chlorate or sodium chlorate and calcium chloride mixture (Atlacide) applied as a spray with blister rust knapsack sprayer.

2. For eradication of mature plants where they are few and scattered: Application of strong aqueous solution of copper complex to scarified crown or the same chemical applied to end of a freshly cut stem by the rubber tube method.

3. For eradication of seedlings and small resprouts: Sodium chlorate or sodium chlorate and calcium chloride mixture (Atlacide) applied as a spray with blister rust knapsack sprayer. In light, sandy soil seedlings might be hand pulled.

4. For eradication of barberries from private estates and gardens: Application of strong aqueous solution of copper complex to scarified crown or the same chemical applied to end of a freshly cut stem by the rubber tube method.

It should be borne in mind that these tentative suggestions are made on the basis of quantity and cost of chemical, ease of handling, and effectiveness of the method. At this stage of the work the writer cannot temper these suggestions with an adequate appreciation of the practical difficulties faced by the Office of Barberry Eradication. The program of ecological work which is being undertaken on the Maunee area is being watched by the writer with considerable interest. Before a final decision is reached regarding the practicability of chemical methods for barberry eradication the influence of chemicals on the germination of barberry seed should be considered. Is it desirable to stimulate germination of barberry seed and thus rapidly remove them from the eradication picture or should their germination be depressed to the practical minimum by judicious selection of chemicals? It has been observed that Ribes seedlings which come up shortly after parent bushes have been chemically destroyed are abnormally large. While it has not been proved that chlorate stimulates germination and subsequent growth of Ribes, a considerable number of field observations point very strongly to that possibility. With this point in mind, therefore, considerable interest is attached to next season's observations of barberry on the Maunee plots. Following a careful check of the 1930 experiments, it will be possible to decide more definitely on the merits of the four methods just described and to plan experiments at that time which will

would these chemicals and methods more closely to the form most desirable to the needs of the Barbary Office.

Supervision - - - H. L. Oxford.

Chemical work - - Van Atta, Ureol, Paper, Ascher, and
Vogelmann

Morphological - - Becker, Matt, and
and

Physiological - - (d'Ureol at Moscow)

Division of Work

The chemical work is to be divided between two principal stations, Berkeley and Moscow, and the morphological work is to be undertaken at Berkeley. Physiological experiments such as necessary for chemical and morphological research are to be undertaken at Berkeley and Moscow.

Assignments

- (1) General supervision.
- (2) Preparation of a final report.
- (3) Preparation of Nitella paper for publication in J. A. S.
- (4) Preparation of field notes for follow-up publication.
- (5) Special research assignments.

Organization of light chamber studies. It is proposed that certain control chambers which the University of California is going to build, and use these control chambers for growing and measuring under known conditions of light, temperature and humidity. Chemical and morphological data will be obtained from the plants grown and attempts made to correlate chemical and morphological characteristics of these plants grown under different ecological conditions as they related to general susceptibility to chemical treatment.

- (1) Supervision of all work undertaken at Moscow.
- (2) Greenhouse preparation of plants and measurements.
- (3) Routine chemical analysis.
- (4) Special research assignments for all work at Moscow.

world, these chemicals and materials must closely to the needs of the future office.

On the other hand, it is to be noted that the use of chemical and physical materials in the office is not only a necessity, but also a luxury. It is a luxury because it is a luxury to have a clean, bright, and comfortable office environment. It is a necessity because it is a necessity to have a clean, bright, and comfortable office environment.

1. The first of these is the use of chemical and physical materials in the office.

2. The second of these is the use of chemical and physical materials in the office.

3. The third of these is the use of chemical and physical materials in the office.

4. The fourth of these is the use of chemical and physical materials in the office.

5. The fifth of these is the use of chemical and physical materials in the office.

The following **PART III** relates to the
tion, transcription and publication of the results of the investigation.
OUTLINE OF INVESTIGATIVE WORK

PROJECT 2.3-1, FOR PERIOD SEPTEMBER, 1950 - MAY, 1951

roots of *N. patulifera*, a **personnel** with extensive
ation of chlorophyll, strongly suggests a direct correlation
the **Supervision** - - - H. R. Offord.
evidence has been procured which confirms this procedure.

Chemical work - - Van Atta, d'Urbal, Draper, Keyser, Solisley and
Vogtmann.

Morphological - - Webster, Patty, Quick,
and) Prostate analysis of barberry.

Physiological - - (d'Urbal at Moscow).
Division of Work
The chemical work is to be divided between two experimental
stations, Berkeley and Moscow, and the morphological work is to be under-
taken at Berkeley. Physiological experiments such as necessary for
chemical and morphological research are to be undertaken at Berkeley and
Moscow. This is an oil of high penetrability for these purposes which is
water is discarded preferably for these purposes which is
of oil of high penetrability for these purposes which is
of oil of high penetrability for these purposes which is

Assignments

- Offord:**
- (1) General supervision.
 - (2) Preparation of annual report.
 - (3) Preparation of *Nitella* paper for publication in *P.A.A.*
 - (4) Preparation of field data for follow-up publication.
 - (5) Special research assignment.

Organization of light chamber studies. It is proposed
to rent certain control chambers which the University of California is
planning to build, and use these control chambers for growing ribes and
barberries under known conditions of light, temperature and humidity.
Chemical and morphological data will be obtained from the plants thus
grown and attempts made to correlate chemical and morphological characteris-
tics of these plants grown under different ecological conditions as they
are related to general susceptibility to chemical treatment.

- d'Urbal:**
- (1) Supervision of all work undertaken at Moscow.
 - (a) Greenhouse propagation ribes and barberries.
 - (b) Routine chemical analysis.
 - (c) Special research assignments for all men at Moscow.

- (2) Special Research Assignment.

10. I, J. M. - 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1219, 1220, 1221, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 1247, 1248, 1249, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1259, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1267, 1268, 1269, 1270, 1271, 1272, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1280, 1281, 1282, 1283, 1284, 1285, 1286, 1287, 1288, 1289, 1290, 1291, 1292, 1293, 1294, 1295, 1296, 1297, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1307, 1308, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332, 1333, 1334, 1335, 1336, 1337, 1338, 1339, 1340, 1341, 1342, 1343, 1344, 1345, 1346, 1347, 1348, 1349, 1350, 1351, 1352, 1353, 1354, 1355, 1356, 1357, 1358, 1359, 1360, 1361, 1362, 1363, 1364, 1365, 1366, 1367, 1368, 1369, 1370, 1371, 1372, 1373, 1374, 1375, 1376, 1377, 1378, 1379, 1380, 1381, 1382, 1383, 1384, 1385, 1386, 1387, 1388, 1389, 1390, 1391, 1392, 1393, 1394, 1395, 1396, 1397, 1398, 1399, 1400, 1401, 1402, 1403, 1404, 1405, 1406, 1407, 1408, 1409, 1410, 1411, 1412, 1413, 1414, 1415, 1416, 1417, 1418, 1419, 1420, 1421, 1422, 1423, 1424, 1425, 1426, 1427, 1428, 1429, 1430, 1431, 1432, 1433, 1434, 1435, 1436, 1437, 1438, 1439, 1440, 1441, 1442, 1443, 1444, 1445, 1446, 1447, 1448, 1449, 1450, 1451, 1452, 1453, 1454, 1455, 1456, 1457, 1458, 1459, 1460, 1461, 1462, 1463, 1464, 1465, 1466, 1467, 1468, 1469, 1470, 1471, 1472, 1473, 1474, 1475, 1476, 1477, 1478, 1479, 1480, 1481, 1482, 1483, 1484, 1485, 1486, 1487, 1488, 1489, 1490, 1491, 1492, 1493, 1494, 1495, 1496, 1497, 1498, 1499, 1500, 1501, 1502, 1503, 1504, 1505, 1506, 1507, 1508, 1509, 1510, 1511, 1512, 1513, 1514, 1515, 1516, 1517, 1518, 1519, 1520, 1521, 1522, 1523, 1524, 1525, 1526, 1527, 1528, 1529, 1530, 1531, 1532, 1533, 1534, 1535, 1536, 1537, 1538, 1539, 1540, 1541, 1542, 1543, 1544, 1545, 1546, 1547, 1548, 1549, 1550, 1551, 1552, 1553, 1554, 1555, 1556, 1557, 1558, 1559, 1560, 1561, 1562, 1563, 1564, 1565, 1566, 1567, 1568, 1569, 1570, 1571, 1572, 1573, 1574, 1575, 1576, 1577, 1578, 1579, 1580, 1581, 1582, 1583, 1584, 1585, 1586, 1587, 1588, 1589, 1590, 1591, 1592, 1593, 1594, 1595, 1596, 1597, 1598, 1599, 1600, 1601, 1602, 1603, 1604, 1605, 1606, 1607, 1608, 1609, 1610, 1611, 1612, 1613, 1614, 1615, 1616, 1617, 1618, 1619, 1620, 1621, 1622, 1623, 1624, 1625, 1626, 1627, 1628, 1629, 1630, 1631, 1632, 1633, 1634, 1635, 1636, 1637, 1638, 1639, 1640, 1641, 1642, 1643, 1644, 1645, 1646, 1647, 1648, 1649, 1650, 1651, 1652, 1653, 1654, 1655, 1656, 1657, 1658, 1659, 1660, 1661, 1662, 1663, 1664, 1665, 1666, 1667, 1668, 1669, 1670, 1671, 1672, 1673, 1674, 1675, 1676, 1677, 1678, 1679, 1680, 168

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Morphological - - Webber, Patty, Quirk,

Physiologist - (4'U'pal at Moscow).

The chemical work is to be divided between the Agricultural Station, University of Moscow, and the Agricultural Station of the Academy of Sciences. Physiological experiments will be conducted by the chemical and morphological sections and be conducted at various stations.

: 530110

- (1) General supervision.
- (2) Preparation of annual report.
- (3) Preparation of Biennial report for publication in U.S.A.
- (4) Preparation of Annual report for publication in U.S.A.
- (5) Special research and reports.

is to have certain control elements which the University of California is planning to build, and use these control elements for growing other and better plants under various conditions of light, temperature and humidity. Chemical and morphological data will be obtained from the plants from these and attempts made to correlate chemical and morphological characteristics of these plants from other different ecological conditions at first are related to general susceptibility to chemical treatment.

2. 20000000

- (2) Special Research Assignments:
- (a) Special Research Assignments for all men in branch.
 - (b) Routine chemical analysis.
 - (c) Research, Investigation, and Development.
- (3) Supervision of all work undertaken in branch.

The effect of chlorates on plant functions of respiration, transpiration and photosynthesis and the influence of chlorates on plant enzymes as specialized actions of these three plant functions.

The rapid disappearance of starch from the stems and roots of R. petiolare, a species of Ribes extremely susceptible to the action of chlorates, strongly suggests a direct or indirect action of the chemical on the stored carbohydrates. So far no direct experimental evidence has been procured which explains this phenomenon.

- Van Atta:
- (1) In immediate charge of all chemical work at Berkeley and greenhouse propagation of Ribes and barberries at Berkeley.
 - (2) Proximate analysis of barberry.
 - (3) Special Research Assignment:

Studies in organic and inorganic complex salts of heavy metals with special reference to (a) heavy metal complex salts soluble in an oil of high penetrability for use as a spray on R. inae and other Ribes now resistant to chlorate; (b) development of a practicable tool for the stem or crown injection of heavy metal complex salts.

The development of a complex salt of a heavy metal which is soluble in an oil of high penetrability but preferentially soluble in water is designed primarily for those Ribes which have a small area of leaf surface per foot of live stem. The oil is used as a carrier of the preferentially soluble complex across the suberized stem tissue. Subsequent ready translocation of the complex on the basis of non-reactivity with the plant water extractives is assumed.

Preliminary experiments undertaken on Ribes and barberries indicate that copper complex is unusually successful as a killing agent and moves extensively within the plant when injected or applied to incisions in the stems or crowns. This investigation is designed for the development of a practicable tool and the most satisfactory chemical for this type of work.

- Draper:
- (1) Proximate analysis of Ribes.
 - (2) Special Research Assignment.

Investigations of organic compounds containing elements having unusual valencies involving possible slow change to higher or lower valencies under influence of light. Sodium chlorate, containing pentavalent chlorine, to be kept in mind as example of an inorganic compound of this type.

The effect of chlorates on plant tissues is reported
also, fragmentation and root systems and the influence of chlorates on
plant enzymes as reported by various workers.

The rapid disappearance of chlorates from the system and
roots of *A. testifolius*, a species of *A. testifolius* susceptible to the
action of chlorates, strongly suggests a direct action of
the chemical on the plant system. So far as direct experimental
evidence has been produced which indicates this phenomenon.

(1) In immediate course of all chemical work at Berkeley and
University of Illinois and particularly at
Berkeley.

(3) Proximate analysis of barley. (3) Special Research Assignment

Studies in organic and inorganic complex salts of heavy
metals with special reference to (a) heavy metal complex salts soluble in
an oil of high penetrability for use as a spray on *A. testifolius* and other
kinds now resistant to chlorates; (b) development of a sprayable salt
for the use of direct injection of heavy metal complex salts.

The development of a complex salt of a heavy metal which
is soluble in an oil of high penetrability for use as a sprayable salt in
water is essential for these studies which have a small area of
leaf surface per foot of live stem. The oil is used as a carrier of the
complex salt which enters the plant tissue through the leaves.
Subsequent study of the complex on the basis of non-toxicity
with the plant water system is necessary.

Preliminary experiments on the chlorates on leaves and particularly
indicate that copper complex is unusually successful as a killing agent and
more effectively kills the plant than injected or applied to leaves
in the form of powder. This investigation is being carried out in the
laboratory of the University of Illinois and the most satisfactory chemical for this
type of work.

Project: (1) Proximate analysis of *A. testifolius*. (2) Special Research Assignment.

Investigation of organic compounds containing elements
having various valences particularly those which are soluble in water or have
valences other than of $+1$, $+2$, $+3$, $+4$, $+5$, $+6$, $+7$, $+8$, $+9$, $+10$, $+11$, $+12$, $+13$, $+14$, $+15$, $+16$, $+17$, $+18$, $+19$, $+20$, $+21$, $+22$, $+23$, $+24$, $+25$, $+26$, $+27$, $+28$, $+29$, $+30$, $+31$, $+32$, $+33$, $+34$, $+35$, $+36$, $+37$, $+38$, $+39$, $+40$, $+41$, $+42$, $+43$, $+44$, $+45$, $+46$, $+47$, $+48$, $+49$, $+50$, $+51$, $+52$, $+53$, $+54$, $+55$, $+56$, $+57$, $+58$, $+59$, $+60$, $+61$, $+62$, $+63$, $+64$, $+65$, $+66$, $+67$, $+68$, $+69$, $+70$, $+71$, $+72$, $+73$, $+74$, $+75$, $+76$, $+77$, $+78$, $+79$, $+80$, $+81$, $+82$, $+83$, $+84$, $+85$, $+86$, $+87$, $+88$, $+89$, $+90$, $+91$, $+92$, $+93$, $+94$, $+95$, $+96$, $+97$, $+98$, $+99$, $+100$, $+101$, $+102$, $+103$, $+104$, $+105$, $+106$, $+107$, $+108$, $+109$, $+110$, $+111$, $+112$, $+113$, $+114$, $+115$, $+116$, $+117$, $+118$, $+119$, $+120$, $+121$, $+122$, $+123$, $+124$, $+125$, $+126$, $+127$, $+128$, $+129$, $+130$, $+131$, $+132$, $+133$, $+134$, $+135$, 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$+1231$, $+1232$, $+1233$, $+1234$, $+1235$, $+1236$, $+1237$, $+1238$, $+1239$, $+1240$, $+1241$, $+1242$, $+1243$, $+1244$, $+1245$, $+1246$, $+1247$, $+1248$, $+1249$, $+1250$, $+1251$, $+1252$, $+1253$, $+1254$, $+1255$, $+1256$, $+1257$, $+1258$, $+1259$, $+1260$, $+1261$, $+1262$, $+1263$, $+1264$, $+1265$, $+1266$, $+1267$, $+1268$, $+1269$, $+1270$, $+1271$, $+1272$, $+12$

Field experiments suggest that any chemical compound which is not immediately toxic or caustic and which is capable of slow oxidation or reduction within plant tissue will accomplish remote injury similar to sodium chlorate though no compound has yet been discovered which approaches in magnitude the effect produced by chlorates. This field will be examined in the light of d'Urbal's findings on the effect of chlorate on plant functions.

Keyser, Holaday and Vogtmann: (1) Routine laboratory work at Moscow and Berkeley at discretion of d'Urbal and Vanatta.

Webber: (1) In immediate charge of routine morphological work at Berkeley. (2) Preliminary work on barberry according to methods established for Ribes. (3) Special Research Assignment.

Palisade ratio and phloem to xylem ratio of Ribes and barberry with reference to general susceptibility of the several Ribes and the common barberry to chemical treatment.

Statistical examination of sections of the four Idaho Ribes have shown that R. petiolare, R. viscosissimum, R. lacustre and R. inerme are arranged accordingly in a decreasing order of susceptibility to chemicals when the palisade ratios of the respective species are considered. By palisade ratio is meant the numerical result obtained when the average length of palisade cells is divided by the thickness of leaf. Phloem to xylem ratio is being determined in the same way. Since the palisade ratio may be taken as an indication of the physiological activity of the plant, it may be possible to use this factor as an expression of a plant's susceptibility to chemical injury.

For purposes of morphological investigation the following division of species is suggested:

quick: - R. cereum, R. nevadense, R. roezli, R. montigenum, R. lasianthum, R. triste.

slow: - R. sanguineum and R. lacustre, Oregon; R. watsonianum, R. inerme and R. viscosissimum, California.

Webber: - Berberis vulgaris, R. bracteosum, R. erythrocarpum.

The literature on the external morphology and histology of Berberis vulgaris L. is being thoroughly reviewed by Webber. Following this the external morphology and histology of common barberry leaves, stems

There are several reasons why the study of the nervous system is of great importance. First, it is the basis of all life. Second, it is the basis of all thought. Third, it is the basis of all action. Fourth, it is the basis of all feeling. Fifth, it is the basis of all knowledge. Sixth, it is the basis of all wisdom. Seventh, it is the basis of all power. Eighth, it is the basis of all glory. Ninth, it is the basis of all honor. Tenth, it is the basis of all life.

1. The nervous system is the basis of all life. 2. The nervous system is the basis of all thought. 3. The nervous system is the basis of all action. 4. The nervous system is the basis of all feeling. 5. The nervous system is the basis of all knowledge. 6. The nervous system is the basis of all wisdom. 7. The nervous system is the basis of all power. 8. The nervous system is the basis of all glory. 9. The nervous system is the basis of all honor. 10. The nervous system is the basis of all life.

The nervous system is the basis of all life. It is the basis of all thought, all action, all feeling, all knowledge, all wisdom, all power, all glory, all honor, and all life.

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and roots will be studied in detail, keeping in mind the points of special significance (listed below) which have been determined for Ribes. *Alnus*, *Salix*, *Cornus* and *Rhamnus* (all Idaho species) will also be examined in the light of histological factors shown by earlier work on *Ribes* to be most significant in regard to susceptibility to chemical treatment.

(1) In the case of each *Ribes* species the following points should be investigated:

Internal Morphology

- (1) Herbage production, including:
 - (a) Leaf size.
 - (b) Average number of leaves produced along main axis of current season's shoot.
 - (c) Average number of leaves present along main axis of current season's shoot at date of collection.
 - (d) Development of axillary buds on current season's shoots.
 - (e) Size of current season's shoots. (Length and basal diameter.)
- (2) Epidermal characters including:
 - (a) Nature of trichomes (glands, simple hairs and prickles) and their abundance.
 - (b) Stomatal number per sq. mm.
 - (c) Stomatal size.
 - (d) Hydathode number per leaf tooth.
 - (e) Hydathode size.
- (3) Relative development of major veins and petioles.

Histology

(1) Leaves.

For each leaf, cross sections of the leaf blade should be made at approximately the mid-point of the mid-rib. On such sections the following measurements should be made at a point free from large veins.

- (a) Leaf thickness.
- (b) Depth of upper and lower epidermal cells.
- (c) Thickness of outer epidermal walls.
- (d) Palisade depth.

Palisade ratios should be computed. The range of structural variation within the mesophyll of a given species should be noted.

Cross sections of old stems should be cut in such a manner that the cortex is retained. The development of tissues outside of the cambium should be observed in order to ascertain the feasibility of computing storage tissue indices for the various species. In regard to xylem structure the following points should be noted:

and roots will be studied in detail, especial to mind the pattern of
 apical cells (lateral walls) which have been determined for lateral
 plates, cells, and roots (all three species) will also be examined
 in the light of morphological factors known to control root growth
 be most significant in regard to morphological factors.

In the case of each species the following points
 should be investigated:

General morphology

- (1) External morphology, including:
 - (a) Leaf shape.
 - (b) Venation pattern of leaves present along main axis of stem.
 - (c) Venation pattern of leaves present along main axis of stem.
 - (d) Development of axillary buds on current season's shoots.
 - (e) Size of current season's shoots. (Length and basal diameter).

(2) Internal characteristics including:

- (a) Nature of stem (3-year, 4-year, 5-year, etc.) and
 their appearance.
- (b) External shape of stem.
- (c) Internal shape of stem.
- (d) Relationship between leaf and shoot.
- (e) Relationship between shoot and stem.

(3) Relative development of major veins and petioles.

Histology

(1) Leaves.

- (a) Leaf thickness.
- (b) Length of leaf and lower epidermal cells.
- (c) Thickness of outer epidermal wall.
- (d) Palisade depth.

Palisade ratios should be compared. The ratio of palisade
 cells in the upper part of a leaf should be noted.

Upper sections of old stems should be cut in cross section and
 the cortex is retained. The development of vascular tissue of the stem
 should be observed in order to ascertain the possibility of comparing
 vascular tissue between the various species. In regard to xylem
 structure the following points should be noted:

- (a) Average width of annual rings.
- (b) Distribution of vessels (ring porous or diffuse porous).
- (c) Number of vessels in a given area. If species has ring porous wood, data should be obtained for spring and fall wood.
- (d) Average maximum diameter of vessels in last formed annual ring.
- (e) Texture of xylem elements other than vessels (fine, medium, coarse).

If a rapid examination of the above sections suggests the existence of specific differences in the amounts of storage tissue, the quantitative development and structure of pith and rays should also be studied.

Plant Material Collected and Proposed and Use to Which Such Material Will be Put

Starch Analysis: R. petiolare, R. viscosissimum, R. lacustre (Idaho), R. inerme, R. lacustre (Oregon); R. bracteosum, R. roezli, R. nevadense, R. erythrocarpum (Berberis vulgaris, data already available).

Tannin Analysis: Ribes ditto as for starch and Berberis vulgaris.

Proximate Analysis: Ribes ditto as for starch except R. erythrocarpum. Also R. lasianthum and R. inerme (Calif.) and Berberis vulgaris. Salix and Alnus sp. (Idaho).

Greenhouse Propagations: R. petiolare, R. lacustre, R. viscosissimum, R. inerme, R. roezli, R. nevadense, Berberis vulgaris.

Greenhouse propagation of Ribes and barberries for use as experimental plants in the course of chemical, morphological and physiological research to be undertaken at Berkeley and Moscow. In so far as is practicable work on Idaho Ribes will be undertaken at Moscow and work on California Ribes at Berkeley.

In order to speed up work on barberries, greenhouse work will be done at both stations.

Through the cooperation of the Department of Botany of the University of California, a Ribes garden one acre in extent is now being established in Strawberry Canyon, a half mile east of the campus. The purpose of the garden is twofold: (1) to establish under cultivation is one

- (a) Average length of service (years)
- (b) Distribution of service (years)
- (c) Number of vessels in a given class
- (d) Data should be obtained for each of the following
- (e) Average number of vessels in each class
- (f) Average of ship elements other than vessels (line, motor, etc.)

It is a well established fact that the development of the
country is dependent on the growth of the agricultural sector.
The Government is committed to the development of the
country and is determined to ensure that the agricultural
sector is able to contribute to the growth of the country.

100 copies of the new brochure are being distributed in the

1947-1948

1. General Information
 2. Physical Description
 3. Chemical Composition
 4. Biological Characteristics
 5. Ecological Data
 6. Geographical Distribution
 7. Historical Records
 8. Conservation Status
 9. References
 10. Appendices

1. The first of these is the fact that the system is not a simple one, but a complex one, involving many different factors, and the second is the fact that the system is not a simple one, but a complex one, involving many different factors.

1918

1. Chlorophyll is the green pigment in plants which captures light energy and converts it into chemical energy in the form of glucose. It is found in the chloroplasts of green plants.

1000

Journal of the American Medical Association
Chicago, Ill.

California Ribes at Berkeley.

It is not to be used as a guide, but as a check on the work of the student.

There is no doubt that the Government of the United States is interested in the progress of the cotton industry in the United States. The Government has been very helpful in the past, and it is hoped that it will continue to be so in the future. The Government has been very helpful in the past, and it is hoped that it will continue to be so in the future.

area a collection of *Ribes* which will be representative of the sub-groups within the genus; (2) to provide material for chemical and morphological tests for the purpose of noting how certain key factors vary for the different species as they continue to grow under somewhat similar ecological conditions.

The ground already has been ploughed, graded, fenced and water services have been installed. Five plants of each of the following species are now in the ground: *R. petiolare*, *R. lacustre*, *R. viscosissimum*, *R. inerme*, *R. roezli*, *R. nevadense* and *R. nistris*. It is further planned to establish typical brush species commonly associated with the various phylogenetic groups.

3. To determine seasonal effect on the toxicity of chemical to *Ribes* and the modifications of that seasonal effect caused by:

- a. Concentration of spray.
- b. pH value of spray.
- c. Presence of different phylogenetic agents.

Note: The use of spray "stickers" and the trial of fire-proofing were reported upon in the 1929 annual report.

FIELD WORK UNDERTAKEN IN 1930

1. The various spray schedules followed in 1929 were checked for effectiveness in *Ribes* kill.

2. Halves of certain plots treated with NaClO_2 , $\text{NaClO}_3 + \text{CaCl}_2$, and HClO_4 were resprayed with the precise formulas used in 1929. Record was kept as near last year's dates as possible. Sprays at pH 6.5 were employed for all experiments.

3. Copper complex sprays, pitch oil, Diesel oil, and combinations of these oils were tested for their toxic action in early season application on *Ribes* stems.

4. Four chemicals were tested by soil application to the root system of *Ribes inerme*.

1. No attempt was made to check plots sprayed with copper complex during the field season of 1930, since it was already known that the

was a collection of these which will be representative of the sub-
groups within the genus, and to provide material for chemical and mor-
phological studies for the purpose of noting any certain key factors vary-
ing for the different species as they pertain to their general charac-
teristics and evolutionary relationships.

The present study has been directed toward the study of the
various species listed. Five species of each of the following
genera are now in the process of being studied: E. carolinensis, E. hirsuta,
E. laticornis, E. longicauda, E. maculosa, E. nana, E. robusta,
E. tenebrosa, E. trilineata, E. viridis, E. vittata, E. zonaria,
It is further planned to study the various species of the
associated with the various E. carolinensis groups.

of which are now in the process of being studied.

of which are now in the process of being studied.

of which are now in the process of being studied.

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of which are now in the process of being studied.

CHEMICAL SPRAY EXPERIMENTATIONS, CLARKIA, IDAHO

1929 tests of Ribes Ribes Field. By: M. F. Staat

Agent

Because of lack of men and of the limited time, work of the

PURPOSES OF PROJECT

(As outlined in Annual Report, 1929)

considerably less effective in their

1. To test the effectiveness, under actual field conditions, of any spray that had shown promise as a Ribicide in laboratory experiments or in small scale field experiments.

In the checking of 37 out of 92 plots, an attempt was made to

2. To determine the relationship between time of application during the day and degree of effectiveness of any given spray.

We decided for the following year

3. To determine seasonal effect on the toxicity of chemical to Ribes and the modifications of that seasonal effect caused by:

on account of the variations in shape of the sections, the

a. Concentration of spray.

b. pH value of spray.

c. Presence of different hygroscopic agents.

d. Ribes seedlings were added, if over, field halves, and

Note: The use of spray "stickers" and the trial of fire-proofing materials for clothing, relative to the handling of sodium chlorate sprays, were reported upon in the 1929 annual report.

direction of M. F. Staat and by the

FIELD WORK UNDERTAKEN IN 1930

1. The various spray schedules followed in 1929 were checked for effectiveness in Ribes kill.

2. Halves of certain plots treated with NaClO_3 , $\text{NaClO}_3 + \text{CaCl}_2$, and Atlacide were resprayed with the precise formulas used in 1929. Respraying was done as near last year's dates as possible. Sprays at pH 6.5 were employed for all experiments.

effective in their

3. Copper complex sprays, pitch oil, Diesel oil, and combinations of these oils were tested for their toxic action in early season application on Ribes stems.

on effectiveness by substituting the feet live and

4. Four chemicals were tested by soil application to the root crowns of Ribes inerme.

STATUS OF CHECKING RESULTS OF 1929 FIELD SEASON

1. No attempt was made to check plots sprayed with copper complex during the field season of 1930, since it was plainly evident that the

CHRONIC SMALL PESTICIDE TOXICITY TEST

1. The test was conducted in the laboratory of the U.S. Department of Agriculture, Agricultural Research Service, Beltsville, Maryland, during the period of August 1, 1950, to August 31, 1950.

THE TEST OF TOXICITY

(as outlined in Annual Report, 1950)

1. To test the effectiveness of the various sprays, a series of laboratory experiments in small scale field experiments.

2. To determine the relationship between the amount of application and the rate of effectiveness of any given spray.

3. To determine whether or not the toxicity of chemical is related to the conditions of the chemical effect caused by:

- a. Concentration of spray.
- b. pH value of spray.
- c. Presence of different phytochemical agents.

Notes: The use of spray "adjuvants" and the use of fine-nozzle materials for chemical, relative to the handling of various chemical sprays, were reported upon in the 1950 annual report.

FIELD WORK UNDERTAKEN IN 1950

1. The various spray schedules followed in 1950 were outlined for effectiveness in Ribes Kill.

2. Values of various plants treated with 2,4-D, 2,4,5-T, and 2,4,6-T were compared with the results obtained in 1949. The results were not statistically different. The results of the 2,4-D were employed for all experiments.

3. Copper complex sprays, plus oil, plus oil, and combinations of these oils were tested for their toxicity in early season application on Ribes Kill.

4. Four chemicals were tested by soil application to the root crown of Ribes Kill.

RESULTS OF CHEMICAL TREATMENT OF RIBES KILL

1. No attempt was made to control plants sprayed with copper complex during the 1950 season of 1950, since it was clearly evident that the

most toxic of these sprays failed to kill more than 1/4 to 1/3 of live stem of H. petiolare, H. inermis or H. lacustre.

Because of lack of men and of the limited time, none of the sodium chlorate-magnesium chloride plots were checked upon in 1929. cursory examinations of these plots indicated that these sprays were considerably less effective in their kills of live stem than were the straight sodium chlorate and the Atlacine sprays. The results of checking on all other sprayed plots are shown in Tables No. 1 to 3 following.

2. In the checking of 37 out of 62 plots, an attempt was made to differentiate between results in live stem reduction by sprays, of morning, noon, and afternoon-sprayed time strips. No consistent results could be obtained for the following reasons:

a. Time strips could not be resurveyed as originally run in 1929 on account of the variations in width of time sections, the occasional removal of time stakes, and the total absence of blazed lines or other permanent marks of reference.

b. Hiber conditions were seldom, if ever, found uniform, but would vary on each time strip for every plot. All the H. lacustre or H. inermis of a plot were frequently found to be located on a single time strip; the work was further complicated by beaver activities in the reduction of H. petiolare and H. inermis live stem.

As a general observation it may be said that for all hiber species encountered in the Clarkia work, the poorest time for spraying, from the standpoint of chemical effectiveness, appeared to be from 2:30 to 4:30 p.m. This is substantiated by field data, worked up into tables, but not incorporated into this report.

In the case of H. petiolare and H. inermis it was found that the most effective kills were made in the morning (8:00 or 9:00 to 11:00 a.m.), while with H. lacustre, sprays were most effective in their kills during midday (11:30 a.m. to 2:30 p.m.).

An attempt was made to differentiate between crew effectiveness and chemical effectiveness by subtracting the feet live stem of what was considered to be missed bushes from the total live stem secured which had survived the sprays. In this regard, crew effectiveness was found to be correlated closely with chemical effectiveness of the various sprays, for morning, midday and afternoon application; the least number of misses were found to occur in the morning, the most in the afternoon. The greatest number of misses were registered against H. lacustre, the least against H. petiolare, the ratio being about 3 1/2 to 1 (live stem figures).

most birds of these species failed to kill more than 1/4 to 1/3 of live
stems of A. pallidus, A. laevis or A. laevis.

Because of lack of time and of the limited time, some of the
sodium chlorate-sodium chlorate plots were sprayed when in full
blossom. Observations of these plots indicated that these plots were
considerably less effective in their kills of birds than were the
plots of sodium chlorate and the chlorate sprays. The results of work-
ing on all other sprayed plots are shown in Table No. 1 to 3 following.

3. In the spraying of 3/4 acre of 25 plots, an attempt was made to
differentiate between results in these live stem retaining sprays, of
sodium, sodium, and alternative-sprayed live stems. No consistent results
could be obtained for the following reasons:

A. Time sprays would not be repeated as originally planned in
1935 on account of the variations in width of live sections, the occasional
removal of live stems, and the total absence of sprayed lines or other
permanent marking of reference.

B. Other conditions were added, if ever, to the uniformity, but
would vary on each time strip for every plot. All the A. laevis or
A. laevis of a plot were frequently found to be located on a single time
strip; the work was further complicated by heavier activities in the
retention of A. pallidus and A. laevis live stems.

In a general observation it may be said that for all birds
species recorded in the birds work, the greatest time for spraying
from the standpoint of chemical effectiveness, appeared to be from 8:00
to 4:00 p.m. This is substantiated by field data, worked up into tables,
has not incorporated into this report.

In the case of A. pallidus and A. laevis it was found that the
most effective kills were made in the morning (8:00 to 11:00 a.m.).
While with A. laevis, sprays were most effective in their kills during
midday (11:30 a.m. to 2:00 p.m.).

An attempt was made to differentiate between areas of effectiveness
and chemical effectiveness by subtracting the live live stems of what was
considered to be missed bushes from the total live stems which
had survived the sprays. In this regard, chemical effectiveness was found
to be correlated closely with chemical effectiveness of the various sprays,
for morning, midday and afternoon application; the least number of misses
were found to occur in the morning, the most in the afternoon. The
greatest number of misses were registered against A. laevis, the least
against A. pallidus, the ratio being about 2 to 1 (live stem figures).

TABLE NO. 1

COMPARISON OF STRAIGHT NaClO_3 SPRAYS IN PER CENT KILL OF RIBES
STEM ON PLOTS SPRAYED 1932 AND CHECKED 1930

| Spray Formula | Plot No. | R. petiolare | | | R. lucustrae | | | R. inermis | | | Date of Spraying 1930 |
|---|------------|-----------------------------------|-------------------------------------|---------------------|-----------------------------------|-------------------------------------|---------------------|-----------------------------------|-------------------------------------|---------------------|-----------------------|
| | | Feet of Live Stem Before Spraying | Per Cent of Live Stem Killed Actual | No. Making Estimate | Feet of Live Stem Before Spraying | Per Cent of Live Stem Killed Actual | No. Making Estimate | Feet of Live Stem Before Spraying | Per Cent of Live Stem Killed Actual | No. Making Estimate | |
| NaClO_3 - 5% .45# per Gallon pH 6.5
Glue | 33 (1) | 12,454 | 76 | 61 | 4 | 101 | 24 | 32,447 | 61 | 35 | July 11 |
| | 43 (1) | 4,483 | 86 | 4 | 4 | 4,139 | 78 | 375 | 80 | 74 | July 26 |
| | 62 (1) | 7,030 | 81 | 97 | 4 | 915 | 64 | 4 | | | August 8 |
| | 77 (1) | 15,552 | 86 | 80 | 8 | 761 | 47 | 55 | | | August 23 |
| | Total Stem | 39,522 | 83.3 | 77.7 | | 5,186 | 70.3 | 22,822 | 61.3 | 105.6 | |
| NaClO_3 - 10% .89# per Gallon pH 6.5
Glue | 43 | 13,443 | 97 | 36 | 4 | 32 | 44 | 11,082 | 77 | 55 | July 11 |
| | 52 | 21,040 | 86 | 36 | 5 | 6,152 | 80 | 1,123 | 87 | 40 | July 26 |
| | 62 | 5,132 | 78 | 78 | 6 | 956 | 72 | 73 | | | August 8 |
| | 77 | 11,572 | 83 | 82 | 8 | 500 | 34 | 31 | | | August 23 |
| | Total Stem | 52,007 | 92.3 | 71.2 | | 7,520 | 84.3 | 12,405 | 78.1 | 95.4 | |
| NaClO_3 - 5% .45# per Gallon pH 4.0
Glue | 38 (1) | 1,750 | 93 | 71 | 4 | 631 | 36 | 33,117 | 40 | 38 | July 23 |
| | 57 (1) | 4,641 | 87 | 97 | 4 | 5,233 | 75 | | | | August 5 |
| | 72 (1) | 3,886 | 81 | 92 | 6 | 1,130 | 48 | 6 | | | August 14 |
| | 95 (1) | 15,121 | 71 | 71 | 6 | 1,288 | 30 | | | | September 3 |
| | Total Stem | 23,198 | 72.5 | 80.1 | | 8,232 | 52.1 | 33,117 | 40 | 38 | |
| NaClO_3 - 10% .89# per Gallon pH 4.0
Glue | 38 | 447 | 79 | 79 | 6 | 307 | 57 | 8,737 | 46 | 46 | July 23 |
| | 57 | 5,264 | 80 | 97 | 5 | 1,351 | 84 | 701 | 44 | 28 | August 6 |
| | 72 | 3,332 | 93 | 94 | 6 | 1,766 | 77 | | | | August 15 |
| | 95 | 13,353 | 70 | 70 | 6 | 67 | 53 | | | | September 3 |
| | Total Stem | 22,973 | 92.3 | 92 | | 4,051 | 75.9 | 9,438 | 45.9 | 34.7 | |
| NaClO_3 - 5% .45# per Gallon pH 8.0
Glue | 33 (1) | 5,630 | 92 | 62 | 4 | 83 | 13 | 27,566 | 32 | 41 | July 16 |
| | 52 (1) | 10,566 | 89 | 91 | 8 | 898 | 59 | | | | July 30 |
| | 67 (1) | 2,711 | 77 | 79 | 7 | 1,763 | 80 | | | | August 12 |
| | 96 (1) | 2,916 | 88 | 38 | 6 | 2,740 | 73 | 1,502 | 18 | 18 | August 29 |
| | Total Stem | 22,123 | 92.8 | 86.7 | | 7,486 | 57.2 | 29,098 | 31.3 | 39.8 | |
| NaClO_3 - 10% .89# per Gallon pH 8.0
Glue | 33 | 333 | 71 | 91 | 5 | 1,331 | 72 | 8,967 | 52.0 | 52 | July 17 |
| | 52 | 6,013 | 95 | 93 | 5 | 1,331 | 67 | | | | July 31 |
| | 57 | 16,107 | 87 | 96 | 5 | 1,470 | 44 | 6 | | | August 12 |
| | 86 | 4,788 | 83 | 83 | 6 | 1,315 | 34 | 886 | 74 | 74 | August 23 |
| | Total Stem | 27,443 | 94 | 93 | | 5,036 | 49.5 | 2,753 | 54 | 54 | |

*Ocular estimate per cent kills used; only actual counts on live stem made.

**Best kills of schedule.

#Best kills of indicated chemicals in all 3 tables.

(1) Plots sprayed with a series of solutions added after original schedule was made up.
All but weighted average per cents rounded off to nearest whole number.Annual Report 1930
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TABLE NO. 2

COMPARISON OF ATLACIDE SPRAYS IN PER CENT KILL OF RIBES STEM ON PLOTS
SPRAYED 1929 AND CHECKED 1930

| Spray Formula | Plot No. | R. petiolare | | | R. lacustre | | | R. ineme | | | Date of Spraying 1929 |
|--|----------|--|-------------------------------------|-----------------------------------|--|-------------------------------------|-----------------------------------|--|-------------------------------------|-----------------------------------|-----------------------|
| | | Feet of Live Stem on Plots Before Spraying | Per Cent of Live Stem Killed Actual | Number Men Making Ocular Estimate | Feet of Live Stem on Plots Before Spraying | Per Cent of Live Stem Killed Actual | Number Men Making Ocular Estimate | Feet of Live Stem on Plots Before Spraying | Per Cent of Live Stem Killed Actual | Number Men Making Ocular Estimate | |
| Atlacide -
5% .68# Per Gal-
lon pH 8.0 Glue | 14 | 11,534 | .. 97- | 49 | 1,420 | .. 61 | 6 | 3,684 | 55 | 6 | July 26 |
| | 63 | 12,168 | 50 | 80 | 4,600 | 52 | 7 | | | 7 | August 9 |
| | 76 | 26,696 | .. 61 | 61 | 1,998 | .. 49 | 8 | | | 8 | August 24 |
| Total Stem | | 50,398 | 76.2 | 62.8 | 8,048 | 46.9 | | 3,684 | 55 | | |
| Weighted Average | | | | | | | | | | | |
| Atlacide -
10% 1.36# Per
Gallon pH 6.5
Glue | 46 | 6,563 | 56 | 94 | 2,802 | .. 60 | 6 | 2,692 | .. 50+ | 6 | July 27 |
| | 50 | 7,419 | .. 97+ | 97 | 1,023 | 47 | 4 | | | 4 | August 10 |
| | 60 | 10,319 | .. 65 | 65 | 644 | .. 19 | 5 | 2,697 | .. 20 | 7 | August 24 |
| Total Stem | | 24,301 | 80.4 | 84.6 | 5,069 | 50.6 | | 5,289 | 37.8 | | |
| Weighted Average | | | | | | | | | | | |
| Atlacide -
5% .68# Per Gal-
lon pH 4.0 Glue | 39 | 484 | 68 | 70 | 527 | .. 71 | 6 | 17,348 | 32 | 6 | July 23 |
| | 58 | 10,809 | .. 88 | 86 | 1,940 | 42 | 4 | 110 | .. 45 | 1 | August 6 |
| | 73 | 4,894 | 82 | 78 | 1,430 | 63 | 5 | | | 5 | August 15 |
| | 90 | 15,773 | .. 45 | 43 | 1,303 | .. 34 | 6 | | | 6 | Sept. 3 |
| Total Stem | | 31,450 | 83.4 | 84.1 | 5,200 | 48.7 | | 17,458 | 32.1 | | |
| Weighted Average | | | | | | | | | | | |
| Atlacide -
10% 1.36# Per
Gallon pH 4.0
Glue | 41 | 10,400 | .. 97 | 96 | 2,859 | .. 78 | 7 | 898 | .. 55 | 7 | July 24 |
| | 50 | 5,525 | .. 96 | .. 96+ | 2,927 | .. 76 | 4 | 860 | .. 52 | 4 | August 7 |
| | 75 | 33,347 | .. 53 | 53 | 1,630 | .. 38 | 5 | | | 5 | August 21 |
| | 98 | 4,400 | .. 70 | 70 | 320 | .. 46 | 6 | | | 6 | Sept. 4 |
| Total Stem | | 53,172 | 82.7 | 82.7 | 7,451 | .. 67.1 | | 1,759 | .. 53.5 | | |
| Weighted Average | | | | | | | | | | | |
| Atlacide -
5% .68# Per Gal-
lon pH 8.0
Glue | 53 | 11,052 | .. 96 | 87 | 1,116 | .. 66 | 8 | | | 8 | July 31 |
| | 66 | 1,780 | 52 | 51 | 870 | 40 | 7 | | | 7 | August 12 |
| | 87 | 4,863 | .. 77 | 77 | 1,076 | 46 | 6 | | | 6 | August 29 |
| Total Stem | | 29,401 | .. 91.2 | 87.3 | 2,562 | 54.6 | | | | | |
| Weighted Average | | | | | | | | | | | |

* Ocular estimate per cent kills used; only actual counts on live stem made.

.. Best kills of schedule.

Best kills of indicated chemical.

All but weighted average per cents rounded off to nearest whole number.

TABLE NO. 3

COMPARISON OF NaClO₃ + CaCl₂ (MIXED) SPRAYS IN PER CENT KILL OF RIBES STEM ON
PLOTS SPRAYED 1929 AND CHECKED 1930

| Spray Formula | Plot No. | R. petiolare | | | | R. lacustre | | | | R. inerme | | | | Date of Spraying 1929 |
|--|----------|--|------------------------------|-----------------|-----------------------------------|--|------------------------------|-----------------|-----------------------------------|--|------------------------------|-----------------|-----------------------------------|-----------------------|
| | | Feet of Live Stem on Plots Before Spraying | Per Cent of Live Stem Killed | | Number Men Making Ocular Estimate | Feet of Live Stem on Plots Before Spraying | Per Cent of Live Stem Killed | | Number Men Making Ocular Estimate | Feet of Live Stem on Plots Before Spraying | Per Cent of Live Stem Killed | | Number Men Making Ocular Estimate | |
| | | | Actual Measurement | Ocular Estimate | | | Actual Measurement | Ocular Estimate | | | Actual Measurement | Ocular Estimate | | |
| NaClO ₃ - 5% .45#
Per Gallon CaCl ₂ .23# Per Gallon
pH 6.5 Glue | 25(1) | 9,153 | 84 | 70 | 4 | 37 | 30 | 7,283 | ** 69 | 37 | 4 | July 12 | | |
| | 45(1) | 13,618 | ** 96 | 68 | 6 | 3,081 | ** 62 | 6,019 | 64 | 38 | 6 | July 27 | | |
| | 64(1) | 27,103 | 83 | 81 | 6 | 1,810 | 43 | | | | | August 9 | | |
| | 79(1) | 11,372 | * 39 | 39 | 8 | 308 | * 29 | 507 | * 17 | 17 | 6 | August 24 | | |
| Total Stem | | 61,256 | 77.9 | 68.6 | | 5,236 | 53.3 | 15,809 | 64.9 | 35.7 | | | | |
| Weighted Average | | | | | | | | | | | | | | |
| NaClO ₃ - 10% .89# Per Gallon
CaCl ₂ .47# Per Gallon
pH 6.5 Glue | 25 | 4,014 | 95 | 79 | 4 | 126 | 23 | 9,549 | 48 | 43 | 4 | July 13 | | |
| | 45 | 27,029 | ** 98 | 90 | 6 | 1,553 | ** 77 | 1,704 | ** 70 | 39 | 6 | July 27 | | |
| | 64 | 13,646 | 92 | 95 | 5 | 2,986 | 66 | 649 | 42 | | | August 9 | | |
| | 79 | 3,470 | * 50 | 60 | 8 | 426 | * 25 | 655 | * 29 | 29 | 8 | August 24 | | |
| Total Stem | | 48,159 | * 93.9 | 88.3 | | 5,091 | * 64.9 | 12,557 | 49.7 | 41.7 | | | | |
| Weighted Average | | 10,743 | 83 | 49 | 4 | 159 | 37 | 11,727 | 38 | 32 | 4 | July 24 | | |
| NaClO ₃ - 5% .45#
Per Gallon CaCl ₂ .23# Per Gallon
pH 4.0 Glue | 59(1) | 9,743 | ** 93 | 86 | 6 | 1,415 | ** 66 | 2,698 | ** 44 | 30 | 6 | August 6 | | |
| | 74(1) | 6,871 | 85 | 87 | 6 | 1,371 | 42 | | | | | August 15 | | |
| | 97(1) | 16,424 | * 41 | 41 | 6 | 1,249 | * 17 | | | | | September 4 | | |
| Total Stem | | 43,781 | 70.3 | 60.2 | | 4,194 | 42.5 | 14,425 | 39.1 | 31.6 | | | | |
| Weighted Average | | | | | | | | | | | | | | |
| NaClO ₃ - 10% .89# Per Gallon
CaCl ₂ .47# Per Gallon
pH 4.0 Glue | 40 | 26,825 | * 96 | ** 96 | 7 | 511 | * 64 | 5,386 | * 72 | ** 72 | 7 | July 24 | | |
| | 59 | 2,300 | * 96 | 96 | 7 | 2,747 | * 70 | 2,437 | * 67 | 67 | 7 | August 7 | | |
| | 74 | 16,397 | * 69 | 69 | 5 | 256 | * 57 | | | | | August 21 | | |
| | 97 | 16,584 | * 75 | 75 | 5 | 1,817 | * 54 | | | | | September 4 | | |
| Total Stem | | 62,206 | 83.3 | 83.3 | 5 | 5,331 | 65.3 | 7,823 | * 70.4 | 70.4 | | | | |
| Weighted Average | | 5,425 | 93 | 71 | 4 | 2,785 | 60 | 16,500 | 35 | 25 | 4 | July 20 | | |
| NaClO ₃ - 5% .45#
Per Gallon CaCl ₂ .23# Per Gallon
pH 8.0 Glue | 35(1) | 15,362 | 88 | 89 | 7 | 2,225 | ** 66 | 268 | ** 48 | | | August 3 | | |
| | 69(1) | 6,560 | ** 98 | 94 | 6 | 1,438 | 31 | | | | | August 13 | | |
| | 85(1) | 5,203 | * 71 | 71 | 6 | 616 | * 33 | 5,169 | * 26 | 26 | 3 | August 25 | | |
| Total Stem | | 32,570 | 88.1 | 84 | | 7,064 | 53.6 | 23,937 | 33.2 | 25.5 | | | | |
| Weighted Average | | | | | | | | | | | | | | |

*Ocular estimate per cent kills used; only actual counts on live stem made.

**Best kills of schedule.

Best kills of indicated chemical.

(1) Plots sprayed with a series of solutions added after original schedule was made up.

All but weighted average per cents rounded off to nearest whole number.

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Such factors as varying field conditions, varying weather conditions, discomforts due to insects, and mental attitude of the men, no doubt accounted for the great discrepancies recorded for crew effectiveness from plot to plot. In order to complete the spraying schedules for 1929, the work during that season was no doubt performed at a rate detrimental to crew effectiveness.

3. Tables No. 1 to 3 inclusive are designed primarily to show seasonal differences in spray toxicity; they are also used as the basis for all tables following. Some explanation is deemed necessary to show the derivation of these field tabulations.

During the 1929 field season, approximately 30 different chemical sprays, varying either in plant killing components, in concentration, in hygroscopic agents, or in pH values, were used through four spraying cycles, of from two to three weeks apart, on half-acre plots covering the stream bottom of Merry Creek, and extending a short distance up the slopes. These treated plots were checked for chemical kill on *Ribes* stem by the two following methods.

- a. A 100% bush reconstruction, i.e., foot by foot count of all originally sprayed live stem, dead stem, and new stem of *Ribes* was attempted on each half-acre plot.
- b. An average of several men's ocular estimates of the per cent of kill of each *Ribes* species involved, was obtained. These estimates were based on the study of several representative sprayed bushes on each plot,-- the general "killed" appearance over the whole plot also entering into each man's estimate.

The manner of reconstructing sprayed *Ribes* brush, in practice, worked out as follows: an actual count of all stem, both dead and alive, of smaller bushes was made, and the larger clumps were carefully estimated. Thus every *Ribes* bush on a plot entered into the result obtained for the chemical toxicity of the given spray, but per cents of kill by count were based solely on the total feet of *Ribes* stem involved, irrespective of plant size.

To show seasonal effect on the toxicity of chemical to *Ribes*, the following table is based on actual stem counts from Tables No. 1 to 3 preceding.

Only 33 plots were found to sustain *R. inermis* growth; therefore, no attempt has been made to tabulate the seasonal effects of chemical spray upon this species.

both factors as varying field conditions, varying weather conditions, discomforts due to insects, and mental attitude of the man, no doubt accounted for the great discrepancies recorded for crew effectiveness from plot to plot. In order to complete the picture recorded for 1935, the work during last season was as best performed as a wise detrimental to crew effectiveness.

Tables No. 1 to 3 inclusive are designed primarily to show seasonal differences in spray toxicity; they are also used as the basis for all tables following. Some explanation is deemed necessary to show the derivation of these field tabulations.

During the 1935 field season, approximately 30 different chemical sprays, varying either in plant killing compounds, in concentration, in hygroscopic agents, or in volume, were used between four spraying cycles, of from two to three weeks apart, on half-acre plots covering the stream bottom of Merry Creek, and extending a short distance up the slopes. These treated plots were checked for chemical kill on slopes stem by the two following methods.

a. A 100% bush reconstruction, i.e., foot by foot count of all originally sprayed live stem, dead stem, and new stem of alder was attempted on each half-acre plot.

b. An average of several men's scoring estimates of the per cent of kill of each alder species involved, was obtained. These estimates were based on the study of several representative sprayed bushes on each plot, - the general killing appearance over the whole plot also entering into each man's estimate.

The manner of reconstructing sprayed alder brush, in practice, worked out as follows: an actual count of all stem, both dead and alive, of smaller bushes was made, and the larger alders were carefully estimated. Thus every alder bush on a plot entered into the count obtained for the chemical toxicity of the given spray, but per cent of kill by count were based solely on the total count of alder stem involved, irrespective of plant size.

To show seasonal effect on the toxicity of chemical to alder, the following table is based on actual stem counts from Tables No. 1 to 3 preceding.

Only 35 plots were found to sustain a linear growth; therefore, no attempt has been made to tabulate the seasonal effects of chemical spray upon this species.

TABLE NO. 4

COMPARISON OF SEASONAL TOXICITY OF SPRAYS

| Species | Spray | No. Plots | Average Per Cent of Live Stem Killed | | | | | | |
|---------------------|--|-----------|--------------------------------------|------------|------------|----------|-----------|------------|-------------------|
| | | | July 11-17 | July 18-24 | July 25-31 | Aug. 1-7 | Aug. 8-15 | Aug. 16-21 | Aug 29 to Sept. 4 |
| <i>A. petiolare</i> | NaClO ₃ | 24 | 87.0 | 86.0 | 97.5 | 98.0 | 88.0 | 86.0 | 88.0 |
| | Attlacide | 17 | | 82.0 | 93.0 | 92.0 | 90.5 | 77.0 | 84.0 |
| | NaClO ₃ + CaCl ₂ | 20 | 89.5 | 91.0 | 97.0 | 98.0 | 90.0 | 71.0 | 82.5 |
| | Totals or Averages | 61 | 88.2 | 86.3 | 95.8 | 94.0 | 89.5 | 78.0 | 86.8 |
| | | | | | | | | | |
| <i>A. laeustre</i> | NaClO ₃ | 23 | 26.0 | 46.5 | 75.0 | 79.5 | 59.0 | 48.0 | 51.0 |
| | Attlacide | 17 | | 74.0 | 63.0 | 59.0 | 52.0 | 36.0 | 42.0 |
| | NaClO ₃ + CaCl ₂ | 20 | 26.5 | 54.0 | 69.5 | 67.0 | 45.5 | 37.5 | 38.0 |
| | Totals or Averages | 60 | 26.2 | 58.1 | 69.1 | 68.5 | 52.1 | 41.0 | 44.6 |
| | | | | | | | | | |

From the above it may be seen that for *A. petiolare* sodium chlorate sprays show a loss in average toxicity of only 4 per cent kill from July 11 to September 4, while the loss is 18 per cent for Attlacide and 27 per cent for sodium chlorate-calcium chloride sprays over this same period.

The toxicity of all sprays on *A. petiolare* increases with the advance of the season, the highest effectiveness being from July 25 to August 7. After the latter date, spray effectiveness gradually drops off, and decidedly breaks after August 15 in the case of Attlacide and sodium chlorate-calcium chloride sprays. The toxicity of straight sodium chlorate sprays appears to drop off a week earlier (August 7) and gradually declines to the end of the season.

The relationship of toxicity of spray to season is further brought out in Table No. 5 which is not based on a direct comparison of average kills on live stem, but is based upon a comparison of the number of plots upon which a relatively high toxicity was maintained. This pictures more graphically what may be expected from the various sprays as the season advances.

STATE TO PROSECUTE

[illegible]

There are three things that may be seen that are not seen in the other two. First, the loss of the ship is not seen in the other two. Second, the loss of the ship is not seen in the other two. Third, the loss of the ship is not seen in the other two.

The toxicity of this water on Chironomus tentans was determined. The median lethal dose (LD₅₀) was 0.001 ml. The 100% lethal dose (LD₁₀₀) was 0.002 ml. The 10% lethal dose (LD₁₀) was 0.0005 ml. The toxicity of this water on Chironomus tentans was determined. The median lethal dose (LD₅₀) was 0.001 ml. The 100% lethal dose (LD₁₀₀) was 0.002 ml. The 10% lethal dose (LD₁₀) was 0.0005 ml.

The preliminary report of the investigation of the case of the missing aircraft, dated 10/10/50, is being prepared by the Bureau of Aeronautics, Department of the Navy, and is being furnished to the Bureau of Naval Personnel, Department of the Navy, for their information.

COMPARISON OF RAINFALL RECORDS BY MONTHS

| Year | 1950-51 | | 1951-52 | |
|-------|---------|--------|---------|--------|
| | Actual | Normal | Actual | Normal |
| July | 1.5 | 1.5 | 1.5 | 1.5 |
| Aug. | 1.5 | 1.5 | 1.5 | 1.5 |
| Sept. | 1.5 | 1.5 | 1.5 | 1.5 |
| Oct. | 1.5 | 1.5 | 1.5 | 1.5 |
| Nov. | 1.5 | 1.5 | 1.5 | 1.5 |
| Dec. | 1.5 | 1.5 | 1.5 | 1.5 |
| Jan. | 1.5 | 1.5 | 1.5 | 1.5 |
| Feb. | 1.5 | 1.5 | 1.5 | 1.5 |
| Mar. | 1.5 | 1.5 | 1.5 | 1.5 |
| Apr. | 1.5 | 1.5 | 1.5 | 1.5 |
| May | 1.5 | 1.5 | 1.5 | 1.5 |
| June | 1.5 | 1.5 | 1.5 | 1.5 |

The above table clearly shows that the rainfall records for the months of July, August, September, October, November, December, January, February, March, April, May, June, and July are all within the normal range of 1.5 inches. This indicates that the rainfall is well distributed throughout the year and is not excessive or deficient in any month.

2. The rainfall of the months of July, August, September, October, November, December, January, February, March, April, May, June, and July are all within the normal range of 1.5 inches. This indicates that the rainfall is well distributed throughout the year and is not excessive or deficient in any month.

The rainfall of the months of July, August, September, October, November, December, January, February, March, April, May, June, and July are all within the normal range of 1.5 inches. This indicates that the rainfall is well distributed throughout the year and is not excessive or deficient in any month.

The rainfall of the months of July, August, September, October, November, December, January, February, March, April, May, June, and July are all within the normal range of 1.5 inches. This indicates that the rainfall is well distributed throughout the year and is not excessive or deficient in any month.

TABLE NO. 6

COMPARISON OF TOXICITIES OF SPRAYS, MODIFIED BY CONCENTRATION, pH VALUE, AND PRESENCE OF DIFFERENT HYGROSCOPIC AGENTS FOR 1929 SEASON

(BASED ON CHECK COUNT ESTIMATES AND A FEW CHECK OCULAR ESTIMATES OF PER CENT KILLS ON RIBES STEM)

| pH Value | Solution | R. petiolare | | | | | | R. lacustre | | | | | | R. inermis | | | | | |
|-------------------|---|--------------------|-----------|---------------|-----------|---------------|-----------|--------------------|-----------|---------------|-----------|---------------|-----------|--------------------|-----------|---------------|-----------|---------------|-----------|
| | | NaClO ₃ | | | Attlacide | | | NaClO ₃ | | | Attlacide | | | NaClO ₃ | | | Attlacide | | |
| | | Per Cent Kill | No. Plots | Per Cent Kill | No. Plots | Per Cent Kill | No. Plots | Per Cent Kill | No. Plots | Per Cent Kill | No. Plots | Per Cent Kill | No. Plots | Per Cent Kill | No. Plots | Per Cent Kill | No. Plots | Per Cent Kill | No. Plots |
| Neutral
pH 6.5 | 10% | 92.3 | 4 | 80.4 | 3 | 93.9 | 4 | 84.3 | 4 | 50.6 | 3 | 64.9 | 4 | 78.1 | 2 | 37.8 | 2 | 49.7 | 4 |
| | 5% | 83.3 | 4 | 76.2 | 3 | 77.9 | 4 | 70.9 | 4 | 46.9 | 3 | 53.3 | 4 | 61.3 | 2 | 35.0 | 1 | 54.9 | 3 |
| | Absolute difference | | | | | | | | | | | | | | | | | | |
| | In favor of 10% | | | | | | | | | | | | | | | | | | |
| | Per cent increase in toxicity of 10% solution | 9.0 | | 4.2 | | 16.0 | | 13.4 | | 3.7 | | 11.6 | | 16.8 | | -17.2 | | -15.2 | |
| Acidic
pH 4.0 | 10% | 10.8 | | | | | | | | | | | | | | | | | |
| | 5% | 92.3 | 4 | 86.7 | 4 | 83.3 | 4 | 75.9 | 4 | 67.1 | 4 | 63.3 | 4 | 45.9 | 2 | 53.5 | 2 | 70.4 | 2 |
| | Absolute difference | 79.5 | 4 | 65.4 | 4 | 70.3 | 4 | 62.1 | 4 | 48.7 | 4 | 42.5 | 4 | 40.0 | 1 | 32.1 | 2 | 39.1 | 2 |
| | In favor of 10% | | | | | | | | | | | | | | | | | | |
| | Per cent increase in toxicity of 10% solution | 12.8 | | 20.3 | | 13.0 | | 13.8 | | 18.4 | | 20.8 | | 5.9 | | 21.4 | | 31.3 | |
| Basic
pH 8.0 | 10% | 16.1 | | | | | | | | | | | | | | | | | |
| | 5% | 94.0 | 4 | 31.0 | | 18.5 | | 22.2 | | 37.8 | | 48.9 | | 14.7 | | 66.7 | | 80.0 | |
| | Absolute difference | 92.8 | 4 | 91.2 | 3 | 88.1 | 4 | 59.2 | 4 | 54.6 | 3 | 53.6 | 4 | 31.3 | 2 | | | 33.2 | 3 |
| | In favor of 10% | | | | | | | | | | | | | | | | | | |
| | Per cent increase in toxicity of 10% solution | 1.2 | | | | | | -9.7 | | | | | | 22.7 | | | | | |
| | | 1.3 | | | | | | -19.6 | | | | | | 72.5 | | | | | |

The following is a discussion of Table No. 6.

ON THE EFFECT OF pH IN CHLORATE SPRAY EXPERIMENTATION

Ten per cent solutions give consistently better kills on all three ribes species studied than do five per cent solutions. The general average of all pH 6.5 sprays shows 12.2 per cent better kill on R. petiolare and 16.2 per cent better kill on R. lacustre in favor of the 10 per cent solutions, and a 24.4 per cent in favor of the 5 per cent sprays in the case of R. inerme, due, no doubt, to the differences in the number of plots involved. The general average of all pH 4.0 sprays shows greater kills of live stem of 21.9 per cent on R. petiolare, 36.3 per cent on R. lacustre, and 53.8 per cent on R. inerme in favor of the 10 per cent solutions.

August 1, 1937
September 10, 1937
showed that most toxic

Sodium chlorate sprays, having a chlorate concentration equivalent to that in the other two types of spray, average 10.35 per cent better kill than Atlacide and 6.46 per cent better kill than sodium chlorate-calcium chloride on R. petiolare stem, and they average 31.34 per cent better kill than Atlacide and 26.33 per cent better kill than sodium chlorate-calcium chloride on R. lacustre. On R. inerme, sodium chlorate sprays average 36.3 per cent better kill than Atlacide, and but .4 per cent better kill than sodium chlorate-calcium chloride.

Data regarding the effect of pH on the effectiveness of chlorate sprays are so inconsistent and the differences so small in the case of pH 6.5 and 8.0 as to render deductions extremely tentative. If the data for plot 23(1) (part of the original area worked in 1928, but omitted, a small difference is shown in favor of the 5 per cent solution at pH 8.0 for the "count figure", while the "estimate figure" favors pH 6.5. Again if plot 23 (part of the original area worked in 1929) is not considered in the case of the 10 per cent solutions, and a comparison is made of the three ensuing series of chlorate sprays at pH 6.5 and 8.0, both "ocular figures" and "count figures" favor the pH 6.5. It should be kept in mind, however, that when dealing with an unbuffered sodium chlorate spray at an original pH of 8.0 that it would very soon be changed by atmospheric CO₂ to a slightly acid spray - while the pH of 6.5 would be made slightly more acid by this same reaction. On the basis of these experiments, therefore, no deductions can be safely drawn relative to the effectiveness of alkaline chlorate solutions on R. petiolare.

However, with the other two species involved, ocular estimates, based on weighted averages, show a 10 per cent solution of Atlacide, pH 4.0 to be the best killer of R. lacustre (57.1% kill), and that a 10 per cent solution of either Atlacide (53.5% kill) or of sodium chlorate-calcium chloride (70.4% kill) pH 4.0, was best on R. inerme, over the whole of the 1929 field season.

The following is a discussion of Table No. 6.

Two per cent solutions give consistently better kills on all three species studied than do five per cent solutions. The general average of all pH 8.5 sprays shows 13.3 per cent better kill on *E. gelidus* and 16.3 per cent better kill on *E. fasciatus* in favor of the 10 per cent solutions, and a 24.4 per cent in favor of the 5 per cent spray in the case of *A. fumus*, but, as shown, in the difference in the number of plants involved. The general average of all pH 8.5 sprays shows a better kill of live stems of *E. gelidus*, 16.3 per cent on *E. fasciatus*, and 23.3 per cent on *A. fumus* in favor of the 10 per cent solutions.

Sodium chlorate sprays, having a chlorate concentration equivalent to that in the other two types of spray, average 10.3 per cent better kill than Alkalide and 6.46 per cent better kill than sodium chlorate-calcium chloride on *E. gelidus* stems; and they average 21.56 per cent better kill than Alkalide and 26.96 per cent better kill than sodium chlorate-calcium chloride on *E. fasciatus*. On *A. fumus*, sodium chlorate sprays average 26.7 per cent better kill than Alkalide, and but .4 per cent better kill than sodium chlorate-calcium chloride.

Data regarding the effect of pH on the effectiveness of chlorate sprays are so inconsistent and the differences so small in the case of pH 8.5 and 8.0 as to render deductions extremely tentative. If the data for pH 8.5 (part of the original series worked in 1930) be omitted, a small difference is shown in favor of the 5 per cent solution at pH 8.0 for the "count figures", while the "estimate figures" favors pH 8.5. Again in part 13 (part of the original series worked in 1930) is not considered in the case of the 10 per cent solutions, and a comparison is made of the three spraying series of chlorate sprays at pH 8.5 and 8.0, both "count figures" and "estimate figures" favor the pH 8.5. It should be kept in mind, however, that when dealing with an emulsion sodium chlorate spray at an original pH of 8.0 that it would very soon be changed by atmospheric CO₂ to a slightly acid spray - while the pH of 8.5 would be made slightly more acid by this same reaction. On the basis of these experiments, therefore, no deductions can be safely drawn relative to the effectiveness of alkaline chlorate solutions on *E. gelidus*.

However, with the other two species involved, similar estimates, based on weighted averages, show a 10 per cent solution of Alkalide, pH 4.0 to be the best killer of *E. fasciatus* (57.1% kill), and that a 10 per cent solution of either Alkalide (55.6% kill) or of sodium chlorate-calcium chloride (70.4% kill) pH 4.0, was best on *A. fumus*, over the whole of the 1932 field season.

TABLE NO. 7
REPORT ON NEW WORK IN CHEMICAL SPRAY EXPERIMENTATION
CLARKIA, IDAHO, 1930

| Plot No. | Treatment | Area Covered | Amount of Ribicide Used | | Time Taken to Spray | | Status of Work
Additional Remarks |
|-------------|--|--------------------|-------------------------|-----------|------------------------|--------|--|
| | | | Pounds | Gallons | Actual | Spread | |
| 100-
106 | Copper complex sprays | 7 (1/2 acre) plots | | 204 | | | Sprays discontinued July 20, 1930, while on second series of applications. Observations August 1, 1930 and September 10, 1930 showed that most toxic of 4 new sprays tried, failed to kill out less than 20% of the Ribes. |
| 116 | Pitch oil, straight spray | 1/2 acre | | 32 | | | Plots 116-119 inclusive to be checked for toxicity of sprays in 1931. |
| 117 | Diesel oil, straight spray | 1/2 acre | | 72 | | | Had to be gone over twice due to poor job initially. Only 3/4 of ground covered second time over as oil supply ran out. |
| 118 | Pitch oil - 1 part by volume
Diesel oil - 1 part by volume | 1/8 acre | | 13 | | | Spraying discontinued July 15, 1930 due to toxic action of pitch oil on men handling pumps. |
| 119 | Pitch oil - 1 part by volume
Diesel oil - 4 part | 1/4 acre | | 19 | | | Spraying discontinued July 15, 1930 due to toxic action of pitch oil on men handling pumps. |
| 109 | NaClO ₃ 2 pounds per gallon
Atlacide 2-1/2 pounds per gallon | 1/2 acre | 456
112-1/2 | 233
45 | 22 hours
30 min. | 7 days | Root crown experiment plots, 109-112 inclusive, to be checked for toxicity of chemicals on <u>R. inerme</u> root crowns 1931. |
| 110 | Zn NH ₄ Cl ₃
2 pounds per gallon | 1/2 acre | 740 | 370 | 29 hours
5 min-utes | 5 days | Leaves of willows withered and fell soon after treatment of plot. Two weeks after defoliation, green buds and new leaves were seen. |
| 111 | Cu. complex 2 pounds per gallon | 1/6 acre | 200 | 100 | 8 hours
30 min-utes | 2 days | Not completed |
| 112 | NaCl (ice cream salt)
2 pounds per gallon | 3/12 acre | 1,270 | 645 | 127 hours | 9 days | Not completed because of lack of time and inclement weather. |

Annual Report 1930
F. F. Staar

5. Ocular estimates of Ribes kill, based on weighted averages, were found to be conservative in 37 cases out of 44 for all 3 species studied, when compared with the count estimate figures appearing in Table No. 6. It was found that in the other 7 cases, the ocular estimate figures ran over the count estimate figures an average of 3.2 per cent (from 0.5% low to 8.5% high). Of these 7 cases, 4 appear under Atlacide sprays and the other 3 under straight sodium chlorate sprays. Referring to Table No. 2, it will be seen that the weighted averages of the ocular estimates of kill on R. petiolare, R. lacustre and R. inerme for 10 per cent Atlacide solution with pH of 6.5 are respectively 2.2 per cent, 2.6 per cent and .5 per cent greater than the corresponding weighted count averages for this spray formula. This was one of the last spray schedules to be checked and since the other 4 exceptions appear in spray schedules checked late in the season also, it may be inferred that the ocular method of checking as briefly outlined in this report has much to recommend it over the present accepted method of stem measurement and estimation. It was found that both estimating methods came closest to approaching the same figures on plots sprayed with Atlacide (spraying schedules checked last) and on R. petiolare species for the entire season. The ocular estimate method took decidedly less time than did the 100 per cent count method over every plot checked, and a great saving in man hours was shown, even though 6 or 8 men were used in the former method as against but 2 in the latter. Further experimentation and development of technique is needed before the ocular estimate method of checking can be recommended to take the place of the present laborious and tedious method of reconstructing sprayed Ribes brush.

SUMMARY

Sixty-two plots were checked by actual count and by ocular estimate for chemical and crew effectiveness, by an organized system of checking. Many plots were rechecked several times as a check on the accuracy of the methods in use. On the basis of this check, the per cent kill of Ribes stem by species is given in tabular form for 5 per cent and 10 per cent aqueous solutions of sodium chlorate, Atlacide, and a mixture of sodium chlorate and calcium chloride. Results show that sodium chlorate was more effective than Atlacide, and that Atlacide was more effective than the hygroscopic mixture of chlorate and chloride made up in the field. It was not possible to make an accurate separation of spray data for early, midday and late afternoon work, but general observations suggest that optimum toxicity is secured when the water table within the plant is highest, i.e., up to midday. Sodium chlorate sprays show the smallest (4 per cent) seasonal variation in toxicity. Atlacide and the hygroscopic mixture show, respectively, 18 per cent and 27 per cent differences over the period July 11 to September 4. A general falling off from optimum toxicity is observed for all sprays after August 15. No significant differences were observed among the

g. Similar estimates of insect kill, based on weighted averages, were found to be conservative in 37 cases out of 44 for all 3 species studied, when compared with the count estimate figures appearing in Table No. 6. It was found that in the other 7 cases, the count estimate figures ran over the count estimate figures an average of 3.3 per cent (from 0.8 to 8.9 per cent). Of these 7 cases, 4 represent under estimates and the other 3 under slightly over estimates. Therefore, to Table No. 6, it will be seen that the weighted averages of the count estimates of kill on *A. gossypii*, *A. lactariae*, and *A. linearis* for 10 per cent Alacide solution with pH of 5.5 are respectively 3.3 per cent, 3.3 per cent and 3.3 per cent greater than the corresponding weighted count averages for this spray formula. This was one of the last spray formulas to be checked and since the other 4 experiments appear to agree, whether checked late in the season also, it may be inferred that the usual method of checking as briefly outlined in this report was much to recommend it over the present accepted method of stem measurement and estimation. It was found that both estimating methods came closest to approaching the same figures on plants sprayed with Alacide (syringing Alacide checked last) and on *A. gossypii* species for the entire season. The count estimate method took decidedly less time than did the 100 per cent count method over every plot checked, and a great saving in man hours was shown, even though 5 or 8 men were used in the former method as against but 2 in the latter. Further estimation and development of technique is needed before the count estimate method of checking can be recommended as being the place of the present laborious and tedious method of reconstructing sprayed insect kills.

SUMMARY

Sixty-two plots were checked by actual count and by similar estimate for chemical and crew effectiveness, by an organized system of checking. Many plots were checked several times as a check on the accuracy of the method in use. On the basis of this check, the per cent kill of *A. gossypii* was given in similar form for 10 per cent and 10 per cent aqueous solutions of sodium chlorate, Alacide, and a mixture of sodium chlorate and calcium chloride. Results show that sodium chlorate was more effective than Alacide, and that Alacide was more effective than the hypodermic mixture of chlorate and chloride. It was not possible to make an accurate separation of spray data for early, middle, and late afternoon work, but general observations suggest that optimum toxicity is secured when the water falls within the plants in highest, i.e., up to middle. Results show the earliest (4 per cent) seasonal variation in toxicity. Alacide and the hypodermic mixture show, respectively, 15 per cent and 17 per cent differences over the period July 11 to September 4. A general falling off from optimum toxicity is observed for all sprays after August 15. No significant differences were observed among the

sodium chlorate sprays at pH values of 6.5 and 8.0 for B. petiolare. The strongly acid sprays at pH 4.0 were in general less effective than sprays at the more nearly neutral pH values of 6.5 and 8.0.

In undertaking to search for variations of the magnitude involved in the experiments herein described, the difficulties introduced by a semi-commercial scale of spraying and uncontrollable field factors were not adequately appreciated. After a systematic series of checks had been made on the methodology of data taking it was apparent that data could not be taken with sufficient accuracy to justify any conclusions unless differences were 10 per cent or better. This should be kept in mind when results of the experiments are being examined.

In spreading and intensifying blister rust.

RECOMMENDATIONS FOR FUTURE WORK

It is hoped that ultimately we will have facts and data on work contemplated for the 1931 field season includes:

afforded a good stand.

1. A check for effectiveness in ribes kill and for efficiency of application on all "half plots" which were resprayed in 1930, and on all oil-sprayed and root crown application plots inaugurated in 1930.

2. Continuation and further trial of ribicides, using suitable methods and equipment in the soil application to root crowns of A. inense.

A study of the factors of the disease, following the method of studies of the factors of the disease, was inaugurated for the purpose of obtaining a better understanding of the factors of the disease and pines. A further study was started in 1931. This was an attempt to correlate weather conditions, particularly relative humidity, with intensity of infection.

The progress of the work done on Project 1, 2 and 3 is shown in the following list of individual reports:

1. Checking Ribes Application Work at Lawrence, Kansas, 1931.
2. Checking for Ribes on Spruce at Lawrence, Kansas, 1931.
3. Progress Report on Ribes at Lawrence, Kansas, 1931.
4. Progress Report on Ribes at Lawrence, Kansas, 1931.
5. Progress Report on Ribes at Lawrence, Kansas, 1931.
6. Progress Report on Ribes at Lawrence, Kansas, 1931.
7. Spread of the Ribes at Lawrence, Kansas, 1931.
8. Blister Rust Infection at Lawrence, Kansas, 1931.
9. Summary of Effectiveness of Ribes at Lawrence, Kansas, 1931.

STUDIES IN EFFECTIVENESS OF CONTROL, 1930

By

H. N. Putnam

Associate Pathologist

The general purpose of this project is to determine the effectiveness of Ribes suppression in pine protection. Studies made with this general purpose in mind fall naturally into two groups, as follows: (1) studies on growth and regeneration of Ribes following eradication work, and (2) the effect of known amounts of Ribes per acre in spreading and intensifying blister rust.

It is hoped that ultimately we will have facts and data on which decisions can be made relative to the degree protection has been afforded a pine stand.

The work on this project was carried on in 1930 in a manner generally similar to that in 1929, which was chiefly by means of permanent plots to study the future of the Ribes following eradication efforts, and to study the effect of Ribes left after eradication as an agent in pine infection. In addition to the above mentioned permanent plot studies, a system of disease surveys was inaugurated for the purpose of obtaining impartial quantitative values of infection both on Ribes and pines. A further study was started in 1930. This was an attempt to correlate weather conditions, particularly relative humidity, with intensity of infection.

The progress of the work done on Project 4.2 is shown in the following list of individual reports.

1. Checking Ribes Eradication work at Sevenac Nursery, Raupen, Montana, 1930.
2. Checking for Ribes on Areas in Idaho on Which Ribes Eradication Work was Done, 1924-1930.
3. Progress Report on Cheeky Plot Studies, 1930. Cheeky, B.C.
4. Progress Report on Studies of the Relative Susceptibility of Pinus monticola and P. strobus Growing Under Western Conditions, 1930.
5. Progress Report on Newman Lake Infection Study, Newman Lake, Washington, 1930.
6. Spread of the Rust Study, Chico, Washington, 1930.
7. Blister Rust Infection Surveys in Idaho, 1930.
8. Summary of Effectiveness of Control Studies, 1930.

CHECKING RIBES ERADICATION WORK AT SEVENAC NURSERY

HAUGAN, MONTANA, 1930

By C. M. Chapman

Agent

INTRODUCTION

The Sevenac Nursery at Haugan, Montana produces annually more western white pine planting stock than any other nursery in the world.

In view of the fact that white pine blister rust was spreading rapidly throughout the Pacific Northwest, it was decided in 1927 to survey Ribes conditions around the nursery with a view to protecting the pine planting stock from blister rust. Ribes eradication work started the following year and has been continued until the present time.

PURPOSE

The purpose of checking is to find out the quantity of live Ribes remaining following eradication in order to determine whether or not an area has been given protection against blister rust.

WORK DONE

Following the 1930 eradication work at Sevenac Nursery, a 4 per cent check of the entire area worked was made.

1. Practically 25 per cent of the total stream area was checked.

RESULTS

The results of checking are shown in four ways as follows:

1. Ribes quantities left in each drainage.
2. Ribes classified by species and growth forms.
3. Ribes survival at different distances from the nursery.
4. Effect of brush conditions on Ribes population after eradication.

A. Ribes Quantities Left in Each Drainage.

On the two smallest streams, the results are as follows:

In Table No. 1 is shown the Ribes conditions by drainages following eradication in 1930.

In Table No. 2 the Ribes left after eradication are classified according to species and growth forms.

REPORT OF THE COMMISSIONER OF THE BUREAU OF LAND MANAGEMENT

WYOMING

BY

E. M. CROWLEY

1930

INTRODUCTION

The purpose of this report is to show the results of the survey of the river conditions in the State of Wyoming for the year 1930.

In view of the fact that the river conditions in Wyoming have been reported in the past, it was decided in 1927 to make a new survey of the river conditions in the State. The purpose of this survey was to determine the river conditions in the State for the year 1927. The survey was made by the Bureau of Land Management, U. S. Department of the Interior.

WYOMING

The purpose of this report is to show the results of the survey of the river conditions in the State of Wyoming for the year 1930. The survey was made by the Bureau of Land Management, U. S. Department of the Interior.

WYOMING

Following the 1930 investigation work at various points, a per cent check of the entire area covered was made.

RESULTS OF THE INVESTIGATION

The results of the investigation are given in the report as follows:

1. River conditions in the State of Wyoming.
2. River conditions in the State of Wyoming.
3. River conditions in the State of Wyoming.
4. River conditions in the State of Wyoming.

A. River conditions in the State of Wyoming

In Table No. 1 is shown the river conditions in the State of Wyoming for the year 1930. The survey was made by the Bureau of Land Management, U. S. Department of the Interior.

TABLE NO. 1

RIBES PER ACRE REMAINING AFTER ERADICATION BY SPECIES AND DRAINAGES
SAVENAC NURSERY, HAUGAN,
MONT. 1930

| Area | Milacres Studied | <u>R. petiolare</u> | | <u>R. inermis</u> | | <u>R. lacustre</u> | | All <u>Ribes</u> | |
|--------------------|------------------|---------------------|----------|-------------------|----------|--------------------|----------|------------------|----------|
| | | No. | * F.L.S. | No. | * F.L.S. | No. | * F.L.S. | No. | * F.L.S. |
| Dry Creek | 560 | 12.5 | 32.0 | 42.9 | 46.6 | 10.7 | 22.3 | 66.1 | 100.9 |
| Savenac Creek | 3,100 | 13.6 | 10.9 | 8.1 | 35.4 | 2.2 | 2.9 | 23.9 | 48.2 |
| Timber Creek | 240 | 0 | 0 | 16.7 | 104.2 | 37.8 | 30.0 | 54.5 | 134.2 |
| St. Regis River | 7,080 | 0.3 | 2.5 | 4.6 | 13.0 | 0 | 0 | 4.9 | 15.5 |
| Big Creek | 2,020 | 2.0 | 0.4 | 12.0 | 14.5 | 8.0 | 3.2 | 22.0 | 18.1 |
| Totals or Averages | 12,980 | 4.0 | 5.4 | 8.4 | 21.7 | 2.7 | 2.7 | 16.1 | 39.8 |

* F.L.S. is "Feet of Live Stem."

From a study of Table No. 1 the following facts are indicated:

1. Practically 95 per cent of the total stream type area is located on Savenac Creek, Big Creek and the St. Regis River. These are the main streams of the area and are located nearest the nursery.
2. The smallest amount of Ribes live stem per acre after eradication was found on these three main streams.
3. On every stream R. inermis constituted the bulk of Ribes left after eradication.
4. The largest amount of R. lacustre after eradication was found on the two smallest streams, Dry Creek and Timber Creek.

B. Ribes Classified by Species and Growth Forms.

In Table No. 2 the Ribes left after eradication have been classified according to species and growth forms.

classified according to species and growth forms.

In Table No. 3 the Elites left after classification have been

3. Elites Classified by Species and Growth Form.

In Table No. 1 is shown the classification of Elites on two sample streams, the Green and the Red.

4. The largest number of Elites after classification was found after classification.

5. On every stream Elites dominated the bulk of Elites left after classification.

6. The smallest number of Elites left after classification was found on these three sample streams.

7. The smallest number of Elites left after classification was found on these three sample streams.

* F.L.S. is "Peet of Live Stream."

| Stream | Elites | F.L.S. No. 1 | | | | F.L.S. No. 2 | | | | F.L.S. No. 3 | | | | F.L.S. No. 4 | | | |
|--------------|--------|--------------|------|------|------|--------------|------|------|-------|--------------|-----|-----|-----|--------------|-----|-----|-----|
| | | Elites | | | | Elites | | | | Elites | | | | Elites | | | |
| Red Creek | 18,000 | 4.0 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |
| Green Creek | 2,000 | 2.0 | 0.4 | 1.0 | 1.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |
| Blue Creek | 7,180 | 0.3 | 2.8 | 4.8 | 1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yellow Creek | 240 | 0 | 0 | 10.0 | 10.4 | 20.8 | 20.0 | 27.8 | 15.2 | | | | | | | | |
| Orange Creek | 2,100 | 11.2 | 10.9 | 9.1 | 12.4 | 2.5 | 1.2 | 12.1 | 20.2 | | | | | | | | |
| Pink Creek | 280 | 12.2 | 25.0 | 42.9 | 42.0 | 10.7 | 24.1 | 42.1 | 100.2 | | | | | | | | |

TABLE NO. 3
ELITES FOR EACH STREAMING WITH CLASSIFICATION BY SPECIES AND GROWTH FORM
TABLE NO. 3

TABLE NO. 2

RIBES PER ACRE REMAINING AFTER ERADICATION BY SPECIES AND GROWTH FORMS.
SAYRAC NURSERY, HAUGAN, MONTANA
1930.

| Ribes Species | Surviving Bushes* | | Seedlings | | Sprouts | | Total | |
|---------------------|-------------------|--------|-----------|--------|---------|--------|-------|--------|
| | No. | F.L.S. | No. | F.L.S. | No. | F.L.S. | No. | F.L.S. |
| <i>R. petiolare</i> | 1.4 | 4.6 | 1.3 | .3 | 1.3 | .5 | 4.0 | 5.4 |
| <i>R. inerme</i> | 4.8 | 19.0 | .9 | .2 | 3.7 | 2.5 | 9.4 | 31.7 |
| <i>R. lacustre</i> | 1.2 | 2.3 | .8 | .1 | .7 | .3 | 2.7 | 2.7 |
| All Ribes | 7.4 | 25.9 | 3.0 | .6 | 5.7 | 3.3 | 16.1 | 29.8 |

*Surviving bushes = those bushes present before eradication and escaping eradication.

1. Over 80 per cent of the total feet of live stem per acre was classified as surviving Ribes live stem.

2. Surviving *R. inerme* made up the largest single Ribes factor, constituting nearly 64 per cent of the total live stem left after eradication, not distances from the nursery.

3. An almost negligible amount of seedlings and a small quantity of sprouts were found on the area. From the rust standpoint seedlings and sprouts constitute a potential future menace, but not a particularly important present one because they are very small.

Q. Ribes Remaining at Different Distances From the Nursery.

In Table No. 3 the Ribes per acre have been classified into zones of different distances from the nursery. The locations of the zones are shown on the accompanying map. The distribution of Ribes in the nursery and Ribes in the surrounding area is shown in the accompanying map. This shows the potential danger from the surrounding area for Ribes growth in the nursery.

Amount of Ribes per Acre at Different Distances from the Nursery.

In Table No. 4 the Ribes per acre are shown at different distances from the nursery. This shows the potential danger from the surrounding area for Ribes growth in the nursery.

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| | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1.0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 |
| 1.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 1.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 |
| 1.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 |
| 1.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 |
| 1.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 |
| 1.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 |
| 1.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 |
| 1.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.7 |
| 1.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.7 | 1.8 |
| 2.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.7 | 1.8 | 1.9 |

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See also the note on the first page of the report.

[illegible]

of accounts were found on the spot. When the above mentioned accounts were examined a substantial future menace, but not a particularly important threat to the national life was very much.

100-443887-100

TO THE HONORABLE MEMBERS OF THE HOUSE OF REPRESENTATIVES
OF THE STATE OF NEW YORK:

TABLE NO. 3

RIBES LEFT OF LIVE STEM PER ACRE REMAINING AFTER ERADICATION BY SPECIES AND ZONES, SAGEHEN NURSERY, HAUGAN, MONTANA, 1930.

| Zone | Distance from Nursery in Chains | Estimated Acres of Stream Type | Number of Milacres | Feet of Live Stem Per Acre | | | |
|--------------------|---------------------------------|--------------------------------|--------------------|----------------------------|----------|---------|-------------|
| | | | | R. pet. | R. iner. | R. l.c. | Total Ribes |
| 1 | 0-20 | 21.5 | 3,660 | 7.1 | 12.0 | 1.6 | 27.7 |
| 2 | 20-40 | 67.7 | 2,422 | 3.6 | 23.8 | 5.2 | 32.6 |
| 3 | 40-60 | 132.0 | 5,030 | 2.6 | 30.5 | 1.2 | 34.4 |
| 4 | 60-80 | 52.0 | 1,820 | 12.2 | 27.0 | 5.4 | 44.6 |
| Totals or Averages | | 343.2 | 12,930 | 5.4 | 21.7 | 2.7 | 29.8 |

The following facts are indicated from an examination of Table No. 3.

1. There is not a wide variation in amounts of live stem left per acre at different distances from the nursery.

2. Again the relative abundance of *R. inerme* is demonstrated. The smallest amount of *R. inerme* per acre is greater than that of any combination of single amounts of the other two species per acre.

3. In Zone 1 Ribes were found at the rate of 27.7 feet of live stem per acre, a relatively small amount. However, Ribes at this average rate occurred on 21.5 acres of stream type, giving a calculated total of 2,535 feet of live stem present in the stream type. A glance at the map shows that within Zone 1 Sagehen Creek stream type borders the nursery longitudinally, resulting in a close association of pines in the nursery and Ribes in the stream type. This situation increases very much the potential danger from the relatively few Ribes present in Zone 1.

D. Effect of Brush Conditions on Ribes Population After Eradication.

In Table No. 4 there is shown a comparison of Ribes conditions where brush has been cut and piled and where it was undisturbed.

2. *Chrysomelids*

RECEIVED
JAN 10 1968

| Year | Month | Day | Time | Location | Activity | Remarks |
|------|-------|-----|-------|----------|----------|---------|
| 1961 | 1 | 1 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 2 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 3 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 4 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 5 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 6 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 7 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 8 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 9 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 10 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 11 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 12 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 13 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 14 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 15 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 16 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 17 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 18 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 19 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 20 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 21 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 22 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 23 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 24 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 25 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 26 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 27 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 28 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 29 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 30 | 10:00 | 1000 ft | 1000 ft | 1000 ft |
| 1961 | 1 | 31 | 10:00 | 1000 ft | 1000 ft | 1000 ft |

The following facts are indicated from an examination of these

32

1. There is not a wide variation in amount of the above factors in different instances from the same source.

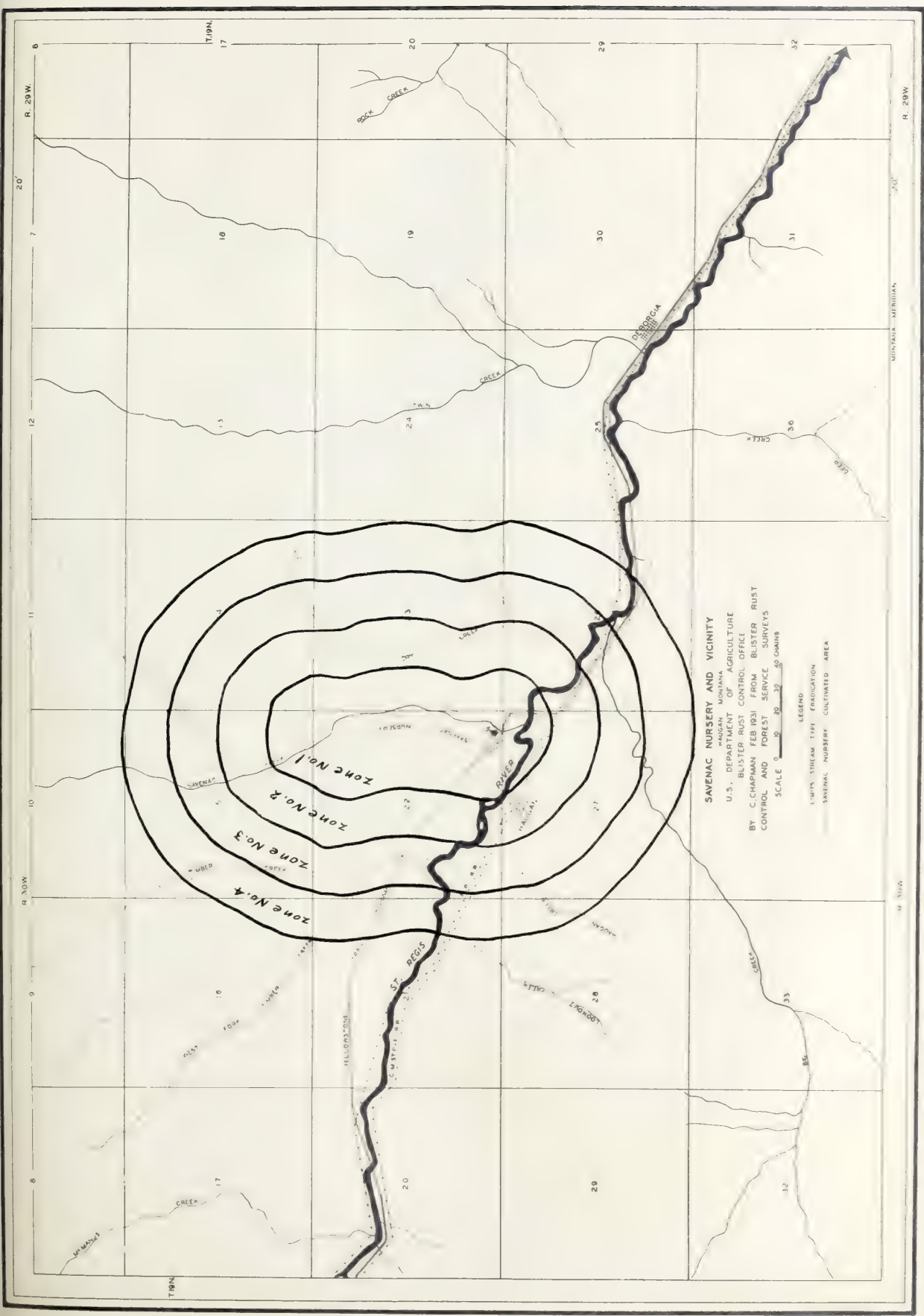
The enclosed amount of £. 100 is for the purchase of the following books:

5. In case I find any trace of the use of the word "life" in any of the above mentioned works, I shall be obliged to inform you of it.

1000

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is Table 10. 4 There is shown a comparison of three conditions. Some of the data are not available for the first condition.



SAVENAC NURSERY AND VICINITY
BLISTER RUST CONTROL OFFICE
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
BY C. CHAPMAN, FEB 1931, FROM BLISTER RUST
CONTROL AND FOREST SERVICE SURVEYS

LEGEND
1/4 IN. STREAM TYPE EDUCATION
SAVENAC NURSERY CULTIVATED AREA

SCALE 0 10 20 30 40 CHAINS

TABLE NO. 4

RIBES PER ACRE REMAINING AFTER ERADICATION ON AREAS OF UNDISTURBED
BRUSH * COMPARED WITH 2 SETS OF AREAS FROM WHICH THE BRUSH WAS
REMOVED.** SAVANNAH CHOK, ST. REGIS RIVER AND BIG CREEK
1930.

| Brush Condition | Ribes Species | Surviving Bushes | | Seedlings | | Sprouts | | Total | |
|-----------------|---------------------|------------------|--------|-----------|--------|---------|--------|-------|--------|
| | | No. | P.L.S. | No. | P.L.S. | No. | P.L.S. | No. | P.L.S. |
| Not cut | <i>R. petiolare</i> | 1.0 | 4.1 | .4 | .1 | 0.0 | 0.0 | 1.4 | 4.2 |
| Cut and piled | <i>R. petiolare</i> | 2.1 | 1.3 | 3.9 | .9 | 7.3 | 2.8 | 13.3 | 5.0 |
| Not cut | <i>R. inerme</i> | 5.1 | 20.0 | .9 | .2 | 3.2 | 2.4 | 9.2 | 22.6 |
| Cut and piled | <i>R. inerme</i> | 1.3 | 3.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 3.2 |
| Not cut | <i>R. lacustre</i> | .4 | .7 | 0.0 | 0.0 | .5 | .2 | .9 | .9 |
| Cut and piled | <i>R. lacustre</i> | .9 | 1.3 | 3.9 | .7 | 1.3 | .6 | 6.1 | 2.6 |
| Not cut | All Ribes | 6.5 | 24.8 | 1.3 | .3 | 3.7 | 2.6 | 11.5 | 27.7 |
| Cut and piled | All Ribes | 4.3 | 5.8 | 7.8 | 1.6 | 8.6 | 3.4 | 20.7 | 10.8 |

*Based on 9,850 milacres.

**Based on 2,330 milacres.

An examination of Table No. 4 reveals several interesting indications. The first is that the amount of brush remaining after eradication was maintained by annual eradication work on the area. The second is that the

1. The chief effect of brush cutting and piling was apparently in reducing the *R. inerme* live stem. Since this Ribes has a habit of extending branches into other deciduous brush, it follows that the removal of this brush enables the eradicators to much more efficiently remove the *R. inerme*.

2. Evidence is not clear-cut in regard to the effect of brush disposal on seedlings and sprouts. There were larger amounts of *R. petiolare* and *R. lacustre* seedlings and sprouts associated with brush-cut than with brush-undisturbed conditions. On the other hand, no *R. inerme* seedlings and sprouts were found on the brush-cut areas.

E. Comparison of 1929 Eradication Work with that of 1930.

In Table No. 5 there is shown a comparison of Ribes quantities remaining after the 1929 and 1930 workings.

TABLE NO. 1

RESULTS FROM AGRICULTURAL RESEARCH STATION - RESEARCH ON THE EFFECTS OF BRUSH REMOVAL ON THE GROWTH OF PINE TREES IN THE BRUSH AREA
 RESEARCH STATION, RESEARCH ON THE EFFECTS OF BRUSH REMOVAL ON THE GROWTH OF PINE TREES IN THE BRUSH AREA
 1930

| Condition | Species | Surviving
Number | Dead
Number | Surviving
Percentage | Dead
Percentage | Total |
|----------------|---------------|---------------------|----------------|-------------------------|--------------------|-------|
| Hot cut | E. perfoliata | 1.0 | 4.1 | 1.0 | 4.1 | 5.1 |
| Cut and killed | E. perfoliata | 2.1 | 4.9 | 2.1 | 4.9 | 7.0 |
| Hot cut | E. laevis | 2.1 | 20.0 | 2.1 | 20.0 | 22.1 |
| Cut and killed | E. laevis | 1.3 | 3.3 | 1.3 | 3.3 | 4.6 |
| Hot cut | E. laevis | 4 | 7 | 4 | 7 | 11 |
| Cut and killed | E. laevis | 2 | 3.3 | 2 | 3.3 | 5.3 |
| Hot cut | All species | 8.8 | 24.3 | 8.8 | 24.3 | 33.1 |
| Cut and killed | All species | 4.3 | 1.8 | 4.3 | 1.8 | 6.1 |

**Based on 3,330 mifaces.
 *Based on 7,200 mifaces.

AN EXAMINATION OF TABLE NO. 1 REVEALS SEVERAL INTERESTING INDICATIONS.

1. The chief effect of brush cutting and killing was apparently in reducing the E. laevis live stem. Since this species has a habit of extending branches into other herbaceous brush, it follows that the removal of this brush enables the eradicator to much more efficiently remove the E. laevis.
2. Evidence is not abundant in regard to the effect of stem disposal on seedlings and sprouts. There were larger numbers of E. laevis and E. perfoliata seedlings and sprouts associated with brush-cut than with brush-unharmed conditions. On the other hand, no E. laevis seedlings and sprouts were found on the brush-cut areas.

RE-EXAMINATION OF 1930 RESEARCH WORK WITH THAT OF 1930.

In Table No. 2 there is shown a comparison of brush conditions remaining after the 1929 and 1930 workings.

TABLE NO. 5

RIBES LIVE STEM PER ACRE REMAINING AFTER ERADICATION IN 1929
COMPARED WITH THAT IN 1930, SAVENAC NURSERY, AUGAR,

DATA

August 1930

| Year | Milacres
Checked | Stuffed | Feet of Live Stem Per Acre | | | |
|------|---------------------|---------|----------------------------|---------------|----------------|-------------|
| | | | R.
petiolare | R.
inermis | R.
lacustre | Total Ribes |
| 1929 | 8,546 | | 84.0 | 1,252.0 | 16.0 | 1,352.0 |
| 1930 | 12,980 | | 3.4 | 21.7 | 2.7 | 23.8 |

It is apparent that the 1930 eradication work at Augar resulted in a very great reduction in Ribes per acre, particularly so in the case of R. inermis.

Areas were not completely worked and checking on such areas was delayed until the job is

CONCLUSION

The nursery sanitation program at Savenac Nursery has succeeded in reducing large concentrations of highly susceptible Ribes to a few scattered small bushes. This excellent condition must be maintained by annual eradication work on the area. If this is not done, the Ribes now present will soon produce live stem sufficient to establish an abundance of blister rust in the nursery.

That there will be a large amount of blister rust on pines close to the nursery is a foregone conclusion. In 1930 rust was found on Ribes at four different locations in the immediate vicinity of the nursery. One location was only a few paces outside the designated protection area on Big Creek, while the other three locations were east of and within 3 miles of the nursery. The cankers resulting from these infections will, in all probability, produce ascia in 1933 in sufficient quantities to quite thoroughly infect the Ribes present around the nursery. It is a precaution necessary to the protection of the pines in the nursery that all Ribes be removed within the one mile protection zone.

CHECKING FOR RIBES ON AREAS IN IDEAS ON WHICH RIBES
ERADICATION WORK WAS DONE 1924-1930

By
H. N. Putnam
Associate Pathologist

INTRODUCTION

Checking for Ribes in 1930 after eradication was confined chiefly to the establishment and examination of permanent check plots on areas eradicated of Ribes in 1930, the examination of permanent check plots established in 1929, and a small amount of checking on areas eradicated of Ribes in 1924, 1925, 1926 and 1928.

The reason for the small amount of checking on 1930 worked areas was that the mopping up process, considered as part of the first working of stream type, was deferred until 1931. Consequently these areas were not considered completely worked and checking on such areas was delayed until the job is finished.

PURPOSE

The purpose of checking is to determine in a quantitative manner by means of permanent and temporary check plots the Ribes conditions existing on areas upon which Ribes eradication work has been performed. This involves a careful study of the growth and regeneration of Ribes on such areas particularly to find out the best time to perform the second eradication.

WORK DONE IN 1930

The checking done in 1930 falls naturally into three divisions: checking on eradication work done in (1) 1930, (2) 1929 and (3) 1924, 1925, 1926 and 1928.

REPORT ON THE ALPINE RESEARCH IN THE ALPINE AREA
IN THE ALPINE AREA 1950-1951

Dr. H. P. P. P.
Associate Professor

INTRODUCTION

Checkers for those in 1950 and 1951 were conducted
chiefly in the establishment and extension of permanent plots
on areas established in 1950, the extension of permanent plots
established in 1950, and a small amount of research on areas
established in 1950, 1950, 1950 and 1950.

The reason for the small amount of checking in 1950 was
that the majority of the areas, completed as part of the first
series of areas, were not checked until 1951. Consequently, the
areas were not checked completely worked and checked on some areas
was delayed until the top of the year.

PURPOSE

The purpose of the research is to determine the effect of
the purpose of checking is to determine in a systematic
manner of areas of permanent and temporary plots in the Alps
some of the areas on which the research was conducted and the
purpose. The purpose is to determine the effect of the research
of areas on the areas of the Alps and the purpose is to
determine the effect of the research.

WORK DONE IN 1950

The research was done in 1950 in the Alps and the purpose
checking on research work done in (1) 1950, (2) 1950 and (3) 1950.
1950, 1950 and 1950.

The research was done in 1950 in the Alps and the purpose
checking on research work done in (1) 1950, (2) 1950 and (3) 1950.
1950, 1950 and 1950.

Table No. 1 constitutes a tabular statement of the checking work done in Idaho in 1930.

TABLE NO. 1

AMOUNT OF CHECKING DONE IN IDAHO IN 1930

| Area Checked | Year of Radiation | Permanent or Temporary | Plots | |
|---|-------------------|------------------------|-------------|---------------|
| | | | Check Plots | Number, Acres |
| Johnson, Shattuck, Cameron Creeks Potlatch Timber Protective Ass'n. | 1930 | Permanent | 36 | 1,462 |
| Parallel Creek, Clearwater Timber Protective Association | 1930 | Temporary | 27 | 765 |
| Potlatch Timber Protective Ass'n. | 1929 | Permanent | 27 | 736 |
| Clearwater Timber Protective Association | 1929 | Permanent | 125 | 3,750 |
| Big Creek, Priest Lake Timber Protective Association | 1928 | Temporary | 8 | 2,418 |
| Binarch, Lamb Creeks, Kaniksu National Forest | 1928 | Temporary | 2 | 500 |
| Binarch, Lamb Creeks, Kaniksu National Forest | 1926 | Temporary | 3 | 700 |
| Upper Priest River, Kaniksu National Forest | 1925 | Temporary | 2 | 1,250 |
| Upper Priest River, Kaniksu National Forest | 1924 | Temporary | 3 | 1,420 |
| Total | | | 233 | 12,054 |

NOTE - Total acres checked in Idaho in 1930 was 12,054. The total number of plots checked was 233. The total number of acres checked by feet of live stem was 12,054.

In partial explanation of the large amount of live stem surviving eradication as shown in Table No. 2, it should be mentioned that the agency which was charged with the work of checking the live stem was not yet completely worked. Furthermore a large number of the surviving live stem of E. milliana was under water when checked in 1930. It should be noted in this report, live stem under water was not checked and this may have been the cause of the large amount of live stem surviving eradication.

Only one log of live stem was checked in 1930 and this was checked by the Clearwater Timber Protective Association, and was under water.

Table No. 1 summarizes a tabular statement of the logging work done in Idaho in 1930.

TABLE NO. 1

STATE OF IDAHO, 1930

| County | Area of land logged, in acres | Value of logs, in dollars | Value of mill products, in dollars |
|---------------|-------------------------------|---------------------------|------------------------------------|
| Adams | 1,482 | 26 | 1,482 |
| Bannock | 700 | 27 | 700 |
| Blaine | 700 | 27 | 700 |
| Boise | 700 | 27 | 700 |
| Butte | 700 | 27 | 700 |
| Camden | 700 | 27 | 700 |
| Carleton | 700 | 27 | 700 |
| Challis | 700 | 27 | 700 |
| Clearwater | 700 | 27 | 700 |
| Coeur d'Alene | 700 | 27 | 700 |
| Condon | 700 | 27 | 700 |
| Curlew | 700 | 27 | 700 |
| Elmore | 700 | 27 | 700 |
| Emery | 700 | 27 | 700 |
| Franklin | 700 | 27 | 700 |
| Gem | 700 | 27 | 700 |
| Idaho | 700 | 27 | 700 |
| Jerome | 700 | 27 | 700 |
| Kootenai | 700 | 27 | 700 |
| Latah | 700 | 27 | 700 |
| Lincoln | 700 | 27 | 700 |
| Madison | 700 | 27 | 700 |
| Mullan | 700 | 27 | 700 |
| Nampa | 700 | 27 | 700 |
| Owyhee | 700 | 27 | 700 |
| Shoshone | 700 | 27 | 700 |
| Teton | 700 | 27 | 700 |
| Twin Falls | 700 | 27 | 700 |
| Valley | 700 | 27 | 700 |
| Washington | 700 | 27 | 700 |
| White | 700 | 27 | 700 |
| Yamhill | 700 | 27 | 700 |
| Total | 12,114 | 322 | 12,114 |

The above table is based on the report of the State Forester, and is subject to change as more information is received.

RESULTS OF CHECKING

A. Checking on Eradication Work Done in 1930

The results of checking by means of permanent check plots on eradication work done along three streams in the Potlatch Timber Protective Association is shown in Table No. 2.

TABLE NO. 2

EFFECT OF RIBES ERADICATION IN 1930 ON THE RIBES POPULATION ALONG THREE STREAMS IN THE POTLATCH TIMBER PROTECTIVE ASSOCIATION, IDAHO

| Item | Cameron Creek | | Shattuck Creek | | Johnson Creek | |
|---|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|
| | Before Eradication | After Eradication | Before Eradication | After Eradication | Before Eradication | After Eradication |
| Number of plots studied | 22 | 23 | 6 | 6 | 8 | 8 |
| Number of milacres studied | 850 | 850 | 166 | 166 | 448 | 448 |
| Feet live stem per acre <i>R. petiolare</i> | 41,705 | 2,257 | 46,964 | 2,795 | 29,197 | 1,302 |
| Feet live stem per acre <i>R. inerme</i> | 611 | 263 | 10,916 | 109 | 3,743 | 324 |
| Feet live stem per acre <i>R. lacustre</i> | 1,634 | 202 | 1,042 | 42 | 5,971 | 335 |
| Feet live stem per acre <i>R. viscosissimum</i> | 0 | 0 | 0 | 0 | 507 | 0 |
| Feet live stem per acre - total <i>Ribes</i> | 44,000 | 2,722 | 58,922 | 2,946 | 39,719 | 1,854 |
| Per cent efficiency by feet of live stem | | 93.8 | | 95.0 | | 96.3 |

In partial explanation of the large amount of *Ribes* live stem surviving eradication as shown in Table No. 2, it must be mentioned that the mop-up work on these areas will not be done until 1931 and hence these areas are not yet completely worked. Furthermore a large amount of the surviving live stem of *R. petiolare* was under water when sprayed. As will be shown further on in this report, live stem under water when sprayed one year has been found to be almost wholly dead the following year, and this condition may obtain here next year.

Only one day's time was devoted to checking on 1930 worked areas in the Clearwater Timber Protective Association, and this checking

TABLE NO. 2

1. Location of the stream and date of the survey

The results of the survey by means of permanent check plots on vegetation along some of the streams in the Potomac Timber Protective Association is shown in Table No. 2.

TABLE NO. 2

RESULTS OF THE SURVEY OF VEGETATION ALONG SOME OF THE STREAMS IN THE POTOMAC TIMBER PROTECTIVE ASSOCIATION

| Stream | Location | Date | Vegetation | Remarks |
|----------|------------|--------|--------------|-----------|
| Stream A | Location A | Date A | Vegetation A | Remarks A |
| Stream B | Location B | Date B | Vegetation B | Remarks B |
| Stream C | Location C | Date C | Vegetation C | Remarks C |
| Stream D | Location D | Date D | Vegetation D | Remarks D |
| Stream E | Location E | Date E | Vegetation E | Remarks E |
| Stream F | Location F | Date F | Vegetation F | Remarks F |
| Stream G | Location G | Date G | Vegetation G | Remarks G |
| Stream H | Location H | Date H | Vegetation H | Remarks H |
| Stream I | Location I | Date I | Vegetation I | Remarks I |
| Stream J | Location J | Date J | Vegetation J | Remarks J |
| Stream K | Location K | Date K | Vegetation K | Remarks K |
| Stream L | Location L | Date L | Vegetation L | Remarks L |
| Stream M | Location M | Date M | Vegetation M | Remarks M |
| Stream N | Location N | Date N | Vegetation N | Remarks N |
| Stream O | Location O | Date O | Vegetation O | Remarks O |
| Stream P | Location P | Date P | Vegetation P | Remarks P |
| Stream Q | Location Q | Date Q | Vegetation Q | Remarks Q |
| Stream R | Location R | Date R | Vegetation R | Remarks R |
| Stream S | Location S | Date S | Vegetation S | Remarks S |
| Stream T | Location T | Date T | Vegetation T | Remarks T |
| Stream U | Location U | Date U | Vegetation U | Remarks U |
| Stream V | Location V | Date V | Vegetation V | Remarks V |
| Stream W | Location W | Date W | Vegetation W | Remarks W |
| Stream X | Location X | Date X | Vegetation X | Remarks X |
| Stream Y | Location Y | Date Y | Vegetation Y | Remarks Y |
| Stream Z | Location Z | Date Z | Vegetation Z | Remarks Z |

In further explanation of the large amount of live trees surviving vegetation as shown in Table No. 2, it must be pointed out that the survey work on these areas will not be done until 1935 and hence these areas are not completely worked. Furthermore a large amount of the surviving live trees of E. virginiana was noted when surveyed. As will be shown further on in this report, live trees were noted when surveyed one year has been found to be almost entirely dead the following year, and this condition may repeat itself again.

Only one day's time was devoted to working on 1935 working areas in the Washington Timber Protective Association, and this amounting

was only by means of temporary check plots. The results are shown in Table No. 3.

TABLE NO. 3

RESULTS OF CHECKING ON MAPLE CREEK, CLEARING TIMBER PROTECTIVE ASSOCIATION, MOUNTED IN 1930

| Number | | Feet Live Stem Per Acre After Eradication | | |
|--------|----------|---|-------------|-------|
| Plots | Milacres | R. petiolare | R. lacustre | Total |
| 27 | 768 | 21.0 | 135.4 | 146.4 |

B. Checking on Eradication Work Done in 1929

Under this heading there are reported the results of examining in 1930 the permanent check plots established in 1929 just before the eradication of Ribes took place that same year. There are also reported the results of a one-time spray application experiment started in 1929.

In Table No. 4 are shown the quantities of Ribes in 1930 on areas worked in 1929.

was only a matter of temporary shock alone. The results are given in Table No. 3.

2. ON SEAT

RECEIVED AT CHICAGO, ILL. MAY 10, 1968

| | | | | |
|----|----|------|------|------|
| 35 | 75 | 0.10 | 1.00 | 1.00 |
|----|----|------|------|------|

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED

Under this heading there are recorded the records of
examined in 1933 the current crop which is 1933 that
before the eradication of this took place this year. There are
also recorded the results of a similar survey applied to
started in 1934.

[illegible]

TABLE NO. 4

RIBES QUANTITIES PER ACRE IN 1930 ON ARMS WORKED IN 1929 ON THE POTLATCH AND CLEARWATER TIMBER PROTECTIVE ASSOCIATIONS, IDAHO

| Timber
Protective
Association | Stream | Mil-
acres
Studied | R. petiolare | | R. inermis | | R. lacustre | | Total Ribes | | Per
Cent
In-
crease
in Live
Stem
Since
Eradica-
tion | | | | |
|-------------------------------------|--------------|--------------------------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|--|---------|-------|---------|-----|
| | | | Feet Live Stem | | Feet Live Stem | | Feet Live Stem | | Feet Live Stem | | | | | | |
| | | | Old* | New** | Old* | New** | Old* | New** | Old* | New** | | | | | |
| Potlatch | Best Fork | | | | | | | | | | | | | | |
| | Potlatch Cr. | 276 | 18.1 | 383.7 | 401.8 | 41.7 | 14.5 | 56.2 | 101.1 | 178.6 | 279.7 | 160.9 | 576.8 | 737.7 | 359 |
| | Mallory Cr. | 204 | 156.3 | 253.2 | 412.2 | 31.9 | 2.5 | 34.4 | 463.7 | 101.4 | 565.1 | 653.9 | 357.8 | 1,011.7 | 55 |
| | Deep Cr. | 306 | 93.1 | 41.5 | 134.6 | 0 | 0 | 0 | 412.6 | 77.3 | 489.3 | 303.9 | 119.0 | 622.9 | 24 |
| | All Streams | 786 | 83.7 | 216.3 | 300.5 | 32.9 | 5.7 | 28.6 | 315.6 | 119.2 | 435.0 | 422.4 | 341.7 | 764.1 | 81 |
| Clear-
water | South Fork | | | | | | | | | | | | | | |
| | Reed's Cr. | 1,022 | 63.5 | 177.3 | 240.8 | 0 | 0 | 0 | 126.4 | 21.0 | 147.4 | 187.9 | 193.3 | 388.2 | 104 |
| | North Fork | | | | | | | | | | | | | | |
| | Reed's Cr. | 652 | 654.9 | 152.3 | 814.1 | 0 | 0 | 0 | 114.2 | 4.1 | 148.3 | 799.1 | 163.3 | 962.4 | 20 |
| | Deer Cr. | 656 | 222.7 | 142.3 | 365.0 | 0 | 0 | 0 | 23.2 | 6.3 | 37.7 | 261.9 | 150.3 | 402.7 | 60 |
| | Alder Cr. | 1,044 | 242.3 | 162.0 | 424.3 | 138.3 | 6.2 | 204.5 | 501.8 | 135.9 | 737.7 | 1,042.4 | 324.1 | 1,366.5 | 31 |
| Clear-
water | Loop Cr. | 146 | 513.6 | 344.5 | 893.1 | 0 | 0 | 0 | 270.5 | 62.3 | 332.8 | 919.1 | 305.8 | 1,225.9 | 33 |
| | All Streams | 3,750 | 276.5 | 162.3 | 445.3 | 55.2 | 1.7 | 56.9 | 244.5 | 43.7 | 293.2 | 576.3 | 220.2 | 795.4 | 38 |

*By the term "old feet live stem" is meant that live stem which was present at the time of eradication and survived it.

**By the term "new feet live stem" is meant that live stem of old bushes, sprouts and seedlings, produced since the time of eradication.

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DATE 08-14-2008 BY 60322 UCBAW

the time of classification.

quotations to suit our

Attention is directed to two important points in Table No. 4.

1. On every stream there has been an appreciable *Ribes* growth in 1930 since eradication in 1929. This increase varies from 20 per cent on the North Fork of Reed's Creek to 359 per cent on the East Fork of Potlatch Creek.

2. The largest increase in live stem in 1930 developed on *R. petiolare* on the East Fork of Potlatch Creek. In general *R. petiolare* showed the highest per cent gain in new live stem of any of the three *Ribes* species. The *R. petiolare* was sprayed and the other two species were hand pulled.

A study was made of the number of bushes per acre on the same stream types as those shown in Table No. 4 and the following facts were indicated:

1. On every stream checked there started after eradication large numbers of *Ribes* seedlings. These varied in number per acre from 85 on Deep Creek to 4,431 on the East Fork of Potlatch Creek.

2. On the average stream type in each Association the order of increasing abundance of bushes was: old bushes, sprouts and seedlings.

3. No seedlings or sprouts of *R. lacustre* were found.

4. More seedlings and sprouts of *R. petiolare* and *R. lacustre* per acre were found on stream type in the Potlatch Timber Protective Association than in the Clearwater Timber Protective Association.

5. There were many more *R. petiolare* than *R. lacustre* seedlings. This was to be expected since before eradication there were more *R. petiolare* than *R. lacustre* bushes.

6. Although the *Ribes* live stem per acre on the lands of the two associations was approximately the same, there were over 4 times as many bushes per average acre in the stream type of the Potlatch Timber Protective Association than of the Clearwater Timber Protective Association. There is indicated a decided difference in the size of bushes. The average size of bushes in the two associations is shown in Table No. 5.

stream type approximated one-fourth of a foot.

7. Approximately 25 per cent of the surviving live stems of *R. petiolare* and 14 per cent of the surviving live stems of *R. lacustre* in 1930 were composed of seedlings.

Attention is directed to the following points in Table No. 4.

1. On every stream there has been an extraordinary rapid growth in 1950 since eradication in 1935. The increase varies from 50 per cent on the North Fork of Reed's Creek to 100 per cent on the East Fork of Potlatch Creek.

2. The largest increase in live fish in 1950 occurred on the North Fork of Potlatch Creek. In general, *E. caeruleus* showed the highest per cent gain in live fish of any of the three species. The *E. caeruleus* was caught and the other two species were hand pulled.

A study was made of the number of houses per acre on the same stream types as those shown in Table No. 4 and the following table was indicated:

1. On every stream studied there showed a rapid increase in average number of houses per acre. Those listed in number per acre from 83 on Reed Creek to 441 on the East Fork of Potlatch Creek.

2. On the average stream type in each association the order of increasing number of houses was: old houses, concrete and asphalt.

3. No seedlings or spores of *E. caeruleus* were found.

4. More seedlings and spores of *E. caeruleus* and *E. leuciscus* were found on stream type in the Potlatch River Protective Association than in the Clearwater River Protective Association.

5. There were many more *E. caeruleus* than *E. leuciscus* seedlings. This was to be expected since before eradication there were more *E. caeruleus* than *E. leuciscus* anywhere.

6. Although the River live fish per acre on the East Fork of the Potlatch was approximately the same, there were over 4 times as many houses per acre in the stream type of the Potlatch River Protective Association than of the Clearwater River Protective Association. There is indicated a decided difference in the rate of growth. The average size of houses in the two associations is shown in Table No. 5.

TABLE NO. 5

AVERAGE FEET OF LIVE STEM PER BUSH IN 1930 ACCORDING TO RIVER SPECIES AND GROWTH FORM IN AREAS FLOODED IN 1922, POTLATCH AND CLEARWATER TIMBER PROTECTIVE ASSOCIATIONS.

| Timber Protective Association | R. petiolare Feet Live Stem Per bush | | | | R. lacustre Feet Live Stem Per bush | | | |
|-------------------------------|--------------------------------------|------------|--------|----------|-------------------------------------|------------|--------|----------|
| | Old Bush* | | Sprout | Seedling | Old Bush* | | Sprout | Seedling |
| | Old** | New Growth | | | Old** | New Growth | | |
| Potlatch | 3.29 | 1.20 | 0.42 | 0.08 | 4.87 | 0.75 | 0.22 | 0.11 |
| Clearwater | 6.82 | 2.00 | 0.63 | 0.11 | 10.54 | 1.73 | 1.87 | 0.13 |
| Both Ass'ns. | 6.41 | 1.91 | 0.58 | 0.09 | 8.44 | 1.37 | 1.16 | 0.11 |

*By "old bush" is meant a bush present before and surviving eradication work.

Sprouts and seedlings are those grown since eradication.

**By "old growth" on old bushes is meant that live stem present before and surviving eradication work, in contradistinction to "new growth" which is the live stem developed on an old bush since eradication work.

Attention is called to the following points in Table No. 5.

1. In every growth-form classification for each association the average bush of R. lacustre was larger than that of R. petiolare.
2. The average size of bush of either species in the stream type of the Clearwater Timber Protective Association was approximately twice that of the Potlatch Timber Protective Association.
3. The average size of the surviving bush was much larger in each species than that of sprouts or seedlings. The last named type of growth showed by far the smallest amount of live stem per bush.
4. The average size of one-year-old Ribes seedlings found in the stream type approximated one-tenth of a foot.
5. Approximately 21 per cent of the surviving live stem of R. petiolare and 14 per cent of the surviving live stem of R. lacustre in 1930 were composed of growth put on since eradication.

TABLE 1

TABLE 1. Growth of *E. coli* in 1953. The data are from the 1953 Annual Report of the U.S. Public Health Service, Bureau of Biological Services, Division of Bacteriology, Washington, D.C.

| Strain | Growth medium | Incubation temperature, °C. | Growth rate, % per hour | | | | Remarks |
|--------|---------------|-----------------------------|-------------------------|---------|---------|---------|---------|
| | | | 0-1 hr. | 1-2 hr. | 2-3 hr. | 3-4 hr. | |
| 1 | Broth | 37 | 1.00 | 1.00 | 1.00 | 1.00 | |
| 2 | Broth | 37 | 1.00 | 1.00 | 1.00 | 1.00 | |
| 3 | Broth | 37 | 1.00 | 1.00 | 1.00 | 1.00 | |
| 4 | Broth | 37 | 1.00 | 1.00 | 1.00 | 1.00 | |
| 5 | Broth | 37 | 1.00 | 1.00 | 1.00 | 1.00 | |
| 6 | Broth | 37 | 1.00 | 1.00 | 1.00 | 1.00 | |
| 7 | Broth | 37 | 1.00 | 1.00 | 1.00 | 1.00 | |
| 8 | Broth | 37 | 1.00 | 1.00 | 1.00 | 1.00 | |
| 9 | Broth | 37 | 1.00 | 1.00 | 1.00 | 1.00 | |
| 10 | Broth | 37 | 1.00 | 1.00 | 1.00 | 1.00 | |

*By "old strain" is meant a strain grown before and surviving emulsification.

Strains not surviving are those grown after emulsification. "Old strain" is old strain to mean that live and present before and surviving emulsification work, in emulsification is "new strain" which is the live then developed on an old strain emulsification work.

Attention is called to the following points in Table No. 1.

1. In every growth-form classification for each emulsification the average push of *E. coli* was larger than that of *E. coli*.
2. The average size of push of *E. coli* was larger in the emulsification of the protective emulsification was approximately twice that of the protective emulsification.
3. The average size of the surviving push was much larger in each emulsification than that of a push of emulsification. The first series of growth noted by the smallest amount of live strain per hour.
4. The average size of one-year-old *E. coli* was larger than in the emulsification one-year or a year.
5. Approximately 15 per cent of the surviving live strain of *E. coli* and 14 per cent of the surviving live strain of *E. coli* in 1953 were composed of growth but no emulsification.

During the early part of the summer of 1937 R. petiolare bushes growing in the water of Deer Creek were sprayed when the stream was high. When the water receded it was observed that the Ribes live stem above the high water mark had been killed, but that that portion under water when sprayed was alive and had sent out numerous leaves. The mass effect of these live stems was that of a green carpet, some six inches thick.

To determine the effect of a chemical spray applied to E. petiolare when much of the live stem was under water, a 1/8 mile strip along the creek was laid out as a permanent plot. Pertinent data were taken in 1929 and the plot rechecked in the spring of 1930 with the following results.

3,957.0 Feet Live Stem were found in the fall of 1974 after one spray.

422.5 Feet Live Stem were found in the spring of 1930.

Another examination of the plot was made in the summer of 1930 with results similar to those in the spring.

Thus it was most gratifying to learn that 2,544.5 feet of live stem or nearly 90 per cent of that surviving eradication in 1929 had died during the winter of 1929-1930 without any additional effort on man's part.

C. Checking on eradication work Done in 1924, 1925, 1926 and 1928.

Under this heading there are reported the results of a very small amount of checking in 1930 on areas worked in the years shown. There are also reported the results of the 1930 examination of a seedling study started in 1928 on Bluncheon Creek.

In Table No. 6 there are shown the results of checking in 1930 on areas worked in 1924, 1925, 1926 and 1928.

| Station | Area |
|----------------------------|------|
| Upper Priest River West of | |
| Point No. 1 | |
| Point No. 2 | |
| Point No. 3 | |
| Point No. 4 | |
| Point No. 5 | |
| Point No. 6 | |
| Point No. 7 | |
| Point No. 8 | |
| Point No. 9 | |
| Point No. 10 | |
| Point No. 11 | |
| Point No. 12 | |
| Point No. 13 | |
| Point No. 14 | |
| Point No. 15 | |
| Point No. 16 | |
| Point No. 17 | |
| Point No. 18 | |
| Point No. 19 | |
| Point No. 20 | |
| Point No. 21 | |
| Point No. 22 | |
| Point No. 23 | |
| Point No. 24 | |
| Point No. 25 | |
| Point No. 26 | |
| Point No. 27 | |
| Point No. 28 | |
| Point No. 29 | |
| Point No. 30 | |
| Point No. 31 | |
| Point No. 32 | |
| Point No. 33 | |
| Point No. 34 | |
| Point No. 35 | |
| Point No. 36 | |
| Point No. 37 | |
| Point No. 38 | |
| Point No. 39 | |
| Point No. 40 | |
| Point No. 41 | |
| Point No. 42 | |
| Point No. 43 | |
| Point No. 44 | |
| Point No. 45 | |
| Point No. 46 | |
| Point No. 47 | |
| Point No. 48 | |
| Point No. 49 | |
| Point No. 50 | |
| Point No. 51 | |
| Point No. 52 | |
| Point No. 53 | |
| Point No. 54 | |
| Point No. 55 | |
| Point No. 56 | |
| Point No. 57 | |
| Point No. 58 | |
| Point No. 59 | |
| Point No. 60 | |
| Point No. 61 | |
| Point No. 62 | |
| Point No. 63 | |
| Point No. 64 | |
| Point No. 65 | |
| Point No. 66 | |
| Point No. 67 | |
| Point No. 68 | |
| Point No. 69 | |
| Point No. 70 | |
| Point No. 71 | |
| Point No. 72 | |
| Point No. 73 | |
| Point No. 74 | |
| Point No. 75 | |
| Point No. 76 | |
| Point No. 77 | |
| Point No. 78 | |
| Point No. 79 | |
| Point No. 80 | |
| Point No. 81 | |
| Point No. 82 | |
| Point No. 83 | |
| Point No. 84 | |
| Point No. 85 | |
| Point No. 86 | |
| Point No. 87 | |
| Point No. 88 | |
| Point No. 89 | |
| Point No. 90 | |
| Point No. 91 | |
| Point No. 92 | |
| Point No. 93 | |
| Point No. 94 | |
| Point No. 95 | |
| Point No. 96 | |
| Point No. 97 | |
| Point No. 98 | |
| Point No. 99 | |
| Point No. 100 | |

TABLE NO. 6

FEET OF LIVE STEM PER ACRE OF RIBES SPECIES IN 1930 COMPARED TO AMOUNTS PER ACRE IMMEDIATELY FOLLOWING
ERADICATION IN 1924, 1925, 1926 AND 1928, NORTHERN IDAHO

| Year
of
Eradication | Area | Eradication
Type | Mil-
acres
Stu-
died | R. lacustre | | R. viscosissimum | | R. inerme | | All Species | | Per
Cent
Increase
in Live
Stem Since
Eradication | Number
Years
Since
Eradication |
|---------------------------------------|---|---------------------|-------------------------------|-----------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|-----------------------------|---|---|
| | | | | F.L.S.
Surviving
1930 | F.L.S.
Surviving | F.L.S.
Surviving | F.L.S.
Surviving | F.L.S.
Surviving | F.L.S.
Surviving | F.L.S.
Surviving | F.L.S.
Surviving
1930 | | |
| 1924 | Upper Priest
River West of
Camp No. 1 | O.R. | 720 | 0 | 0 | 1.9 | 97.4 | 0 | 0 | 1.9 | 97.4 | 5,030 | 6 |
| | Upper Priest
River near
Rock Creek | D.R. | 500 | 0 | 0 | 118.0 | 415.0 | 0 | 0 | 118.0 | 415.0 | 250 | 6 |
| | Upper Priest
River, Small Creek | Stream | 200 | 0 | 38.5 | 0 | 0 | 0 | 0 | 0 | 38.5 | - | 6 |
| | Upper Priest
River Slope of
Cedar Creek | O.F. | 1,000 | 0 | 0 | 20.0 | 74.5 | 0 | 0 | 20.0 | 74.5 | 270 | 5 |
| 1925 | Upper Priest
River | Stream | 250 | 104.0 | 844.0 | 0 | 0 | 0 | 0 | 104.0 | 844.0 | 710 | 5 |
| | Binarch Creek Burn | O.R. | 500 | 8.0 | 74.0 | 0 | 8.0 | 0 | 0 | 8.0 | 82.0 | 320 | 4 |
| 1926 | Upper Lamb Creek | Stream | 200 | 0 | 0 | 0 | 0 | 150.0 | 1,044.5 | 150.0 | 1,044.5 | 600 | 4 |
| 1926
Re-
eradi-
cation
in | Binarch Creek | Stream | 100 | 0 | 25.0 | 0 | 0 | 0 | 0 | 0 | 95.0 | - | 2 |
| 1928 | Lower Lamb Creek | Stream | 200 | 0 | 0 | 0 | 0 | 25.0 | 239.5 | 25.0 | 239.5 | 860 | 2 |
| 1928 | Big Creek C.O. | O.R. | 500 | 0 | 51.6 | 0 | 52.2 | 0 | 0 | 0 | 103.8 | - | 2 |
| | Big Creek | Stream | 668 | 0 | 1.5 | 0 | 0 | 28.7 | 142.9 | 28.7 | 144.4 | 400 | 2 |
| | Fox Creek C.O. | O.R. | 1,000 | 9.2 | 45.0 | 0 | 0 | 0 | 0 | 9.2 | 45.0 | 330 | 2 |
| | Fox Creek | Stream | 250 | 584.0 | 1,148.0 | 0 | 0 | 0 | 0 | 584.0 | 1,148.0 | 100 | 2 |

* By "F.L.S. surviving" is meant the actual live stem that escaped eradication, either as a missed bush, or incomplete pull. The term is used in contradistinction to "F.L.S. 1930" which designates the entire Ribes growth found in 1930 including surviving live stem.

Data presented in Table No. 5 are based on too small an amount of sampling to be conclusive. However, certain facts are indicated.

1. Increases in amounts of live stem from the time of eradication to 1930 varied from 100 per cent increase in stream type worked in 1928 to 5000 per cent increase in open reproduction type worked in 1924.

2. In three instances, on stream types worked in 1924 and 1928, and on open reproduction type worked in 1928, no live stem definitely dating back to time of eradication was found by the checkers.

3. There was the least increase in Ribes live stem in a dense reproduction stand worked in 1924, and in an open pole stand worked in 1925.

4. The one important indication brought out in Table No. 5 is that the Ribes factor as existing after eradication work is not a fixed thing but is constantly increasing in quantity, doubling its live stem or increasing it several times two years or more after eradication, thus each year materially increasing the potential danger from blister rust.

From the viewpoint of determining the best time to rework an area the checkers kept a sharp lookout for Ribes fruits on bushes found on the check strips. No such fruits were seen. This is an important consideration, since the time of re-eradication is governed largely by the desirability of complying with two stipulations: (1) The area must be reworked before the bushes produce fruit; (2) the work on an area must be delayed until the bushes have all reached a size sufficient to be readily seen.

The data from which Table No. 6 was constructed were examined with reference to the origin of bushes found, that is, whether they were surviving bushes, new bushes, from sprouts, or new bushes from seeds. The following points represent the conclusions from this analysis:

1. Of the 13 areas represented by check strips 10 showed bushes surviving eradication; 10 showed new bushes from sprouts, and 12, or all but one, showed new bushes from seeds. The only area showing no Ribes regeneration from seeds was one of dense reproduction worked in 1924.

2. New bushes, both from sprouts and seeds, established themselves quite readily on every area studied, except in the dense reproduction stand worked in 1924 where no bushes from seeds were found.

data presented in Table No. 6 are based on the small amount of sampling to be representative. However, certain facts are indicated.

1. Increase in amount of live stem from time of eradication to 1930 varied from 100 per cent increase in stems type worked in 1925 to 5000 per cent increase in open reproduction type worked in 1934.

2. In three instances, on stems types worked in 1924 and 1925, and on open reproduction type worked in 1926, no live stem definitely dating back to time of eradication was found by the checker.

3. There was the least increase in ribbed live stem in a cases reproduction stand worked in 1924, and in an open pole stand worked in 1925.

4. The one important indication brought out in Table No. 6 is that the ribbed factor as existing after eradication work is not a fixed thing but is constantly increasing in quantity, lessening the live stem or increasing it several times two years or more after eradication, thus each year materially increasing the potential danger from disaster must

from the standpoint of maintaining the best time to rework an area the checker kept a sharp lookout for Ribbed Fruits on bushes found on the check strips. As such fruits were seen, this is an important consideration, since the time of re-eradication is governed largely by the desirability of complying with two stipulations: (1) The area must be reworked before the bushes produce fruit; (2) the work on an area must be delayed until the bushes have all reached a size sufficient to be readily seen.

The data from which Table No. 6 was constructed were examined with reference to the origin of bushes found, that is, whether they were surviving bushes, new bushes, from sprouts, or new bushes from seeds. The following points represent the conclusions from this analysis:

1. Of the 13 areas represented by check strips 10 showed bushes surviving eradication; 10 showed new bushes from sprouts, and 13, or all but one, showed new bushes from seeds. The only area showing no Ribbed regeneration from seeds was one of three reproduction worked in 1925.

2. New bushes, both from sprouts and seeds, established themselves quite readily on every area studied, except in the dense reproduction stand worked in 1924 where no bushes from seeds were found.

In Table No. 7 there are shown data on Ribes found on check strips on an area cut over in 1925. These data are included in Table No. 6.

TABLE NO. 7

CLASSIFICATION OF YOUNG RIBES BUSHES IN 1930 AS TO THE YEAR OF ORIGIN.
AREA CUT OVER 1925. RIBES ERADICATED THEREFROM 1928. BIG
CREEK, IDAHO.

| Ribes Species | 1926 Origin | | 1927 Origin | | 1928 Origin | | 1929 Origin | |
|-------------------------|-------------|----------------------|-------------|----------------------|-------------|----------------------|-------------|----------------------|
| | Number | Ave. F.L.S. Per Bush | Number | Ave. F.L.S. Per Bush | Number | Ave. F.L.S. Per Bush | Number | Ave. F.L.S. Per Bush |
| <i>R. lacustre</i> | 0 | 0 | 6 | 0.43 | 51 | 0.45 | 1 | 0.1 |
| <i>R. viscosissimum</i> | 1 | 6.0 | 6 | 1.83 | 13 | 0.52 | 4 | 0.27 |

Attention is called to the following points in Table No. 7.

The area formerly occupied by Ribes was mostly cleared by logging in 1925.

1. The majority of the seedlings of both species of Ribes found in 1930 originated in 1928. Presumably many seedlings were in immediately following logging in 1925, which were found and destroyed by the eradicators in 1928. Seedlings originating in 1928 and many of those starting in 1927 would have been too small to detect in 1926.

to 1930. In other words the Ribes in number 1928 and 1929.

2. Judging from the fact that no seedlings of 1930 origin, and only a few of 1927 origin were found, it is apparent that the return of Ribes following the major disturbance of logging is about completed. In this instance germination of Ribes lasted over a period of five years from 1925 to 1929 inclusive.

3. The size of the average *R. viscosissimum* bush one to three years old was larger than that of *R. lacustre* of the same age.

In 1928 and 1929.

D. Observations on the Survival of Ribes Seedlings

In Table No. 8 there are shown the results of a count of Ribes seedlings in 1928.

in Table No. 7 there are shown data on birds found on islands
 during an area out over in 1935. These data are included in Table
 No. 8.

TABLE NO. 7

CLASSIFICATION OF BIRDS FOUND IN 1935 IN THE AREA OUT OVER
AREA OUT OVER 1935. BIRDS FOUND IN 1935. BIRDS

| BIRD SPECIES | 1935 DATA | | 1935 DATA | | 1935 DATA | | 1935 DATA | |
|--------------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|
| | NO. | PERCENT | NO. | PERCENT | NO. | PERCENT | NO. | PERCENT |
| 1. LACONIA | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 2. LACONIA | 1 | 1.0 | 1 | 1.0 | 1 | 1.0 | 1 | 1.0 |

Attention is called to the following points in Table No. 7.

1. The majority of the specimens of birds found in 1935 were obtained in 1935. Presumably many specimens were in 1935. The following table in 1935, which were found and destroyed by the
 specimens in 1935. Specimens obtained in 1935 and sent of them
 starting in 1935 would have been too small to select in 1935.

2. Table No. 7 shows the fact that no specimens of 1935 birds, and only
 a few of 1935 birds were found. It is apparent that the birds of 1935
 following the major specimens of 1935 is most complete. In 1935
 numerous specimens of birds found over a period of five years from
 1935 to 1935.

3. The data of the specimens of 1935 birds found over one to three years
 old was larger than that of 1935 birds of the same age.
 4. The data of the specimens of 1935 birds found over one to three years
 old was larger than that of 1935 birds of the same age.

In Table No. 8 there are shown the results of a count of

5. New birds, both from specimens and birds, which were obtained
 birds results on every area studied, except in the case of 1935
 birds found in 1935 where no birds from 1935 were found.

R. lacustre seedlings in 1930 on a rock slide where the parent bushes were eradicated in 1926.

there were found 4 R. lacustre bushes. In the year of the survey there were found 4 bushes. TABLE NO. 8 100 R. lacustre

STUDY OF RIBES REGENERATION AFTER ERADICATION OF A DENSE CONCENTRATION OF R. LACUSTRE ALONG THE EDGE OF A ROCK SLIDE OF UPPER PRIEST RIVER, IDAHO.

Eradication of Parent Bushes - 1926. Checked in 1928, 1930

| Year of Origin | Number of Bushes Found | |
|----------------|------------------------|---------------|
| | Aug. 22, 1928 | Sept. 4, 1930 |
| 1927 | 464 | 1 |
| 1928 | 1,717 | 16 |
| 1929 | | 176 |
| 1930 | | 13 |
| Not known | | 276 |
| Total | 2,181 | 482 |

Before eradication there were 100 R. lacustre bushes present on this plot. When they were eradicated their locations were marked with stakes. In 1930 it was found that a small rock slide had covered the area formerly occupied by bushes numbered 1 to 7 inclusive. However, in former years very few seedlings had been found on this portion of the area.

From Table No. 8 it is apparent that a high mortality rate has obtained since 1926. Thus there was a loss of 1,541 seedlings from 1928 to 1930. In other words the Ribes by number constituted in 1930 only 22 per cent of the number in 1928. The loss in 1930 of seedlings present in 1928 was still greater, since the 1930 figure includes many seedlings of 1929 and 1930 origin. The large number of seedlings of unknown age found in 1930 precludes any conclusions which might be based on the age of seedlings found in 1930. The only fact that is outstanding in this study is the high mortality among these R. lacustre seedlings growing on a rock slide.

In 1926 and again in 1930 observations were made of the Ribes present on the site of one eradication camp in 1924 and 1925 in Upper Priest River Valley. This camp was on an alluvial flat under over-mature cedar and hemlock. No quantitative checks were made of Ribes present either in 1926 or 1930.

1. The first of these is the fact that the Commission has not yet received any information from the Government of the United States regarding the results of its investigation of the activities of the American Friends Service Committee in the Philippines.

1990

~~ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE BY THE MARKS~~

Application of Patent No. 1,000,000 to the United States

| | | |
|----|------|------|
| 1 | 1000 | 1000 |
| 2 | 1000 | 1000 |
| 3 | 1000 | 1000 |
| 4 | 1000 | 1000 |
| 5 | 1000 | 1000 |
| 6 | 1000 | 1000 |
| 7 | 1000 | 1000 |
| 8 | 1000 | 1000 |
| 9 | 1000 | 1000 |
| 10 | 1000 | 1000 |

present other in 1926 or 1930. No consecutive records were made of ridges before Bridge River Valley. This was due to an alluvial flat under over-rides present on the site of the stratification camp in 1924 and 1925 in 1922 and again in 1923 observations were made in 1924. It was found that the alluvial flat was not of a recent origin but was growing on a rock slide. This study is the only scientific study made of the alluvial flat. The only fact that is noteworthy in the study is the fact that the alluvial flat was not of a recent origin but was growing on a rock slide. The study is the only scientific study made of the alluvial flat. The only fact that is noteworthy in the study is the fact that the alluvial flat was not of a recent origin but was growing on a rock slide.

In the 1926 annual report on ecology work, page 145, the results of the 1926 observations are given. Around the cook tent there were found 4 R. viscosissimum. At the site of the methods tent there were found "probably 50 R. viscosissimum and 100 R. lacustre---growing in this gravel-covered portion of the methods tent."

In 1930 a careful examination of this same camp site showed only 4 Ribes, all R. lacustre, one near the cook tent site, one near the camp fire site, one near a pup tent site, and one at the south end of the camp. This constitutes another example of the poor survival of Ribes seedlings. In this case, under shade of over-mature hemlock and cedar, there was no survival of R. viscosissimum to 1930, and only a very small survival of R. lacustre.

SUMMARY

Destruction of the forest by fire in the fall of 1927. In 1930 checking work was done in greater or less degree on areas in Idaho worked in 1930, 1929, 1928, 1926, 1925 and 1924. The one important conclusion that can be drawn from an analysis of the checking done in 1930 is that no matter what the Ribes species or eradication type may be, it is a certainty that the quantity of Ribes left after eradication does not remain constant but will increase greatly in after years and, if not reduced by a later working will constitute a grave menace to associated pines. In other words, there is no assurance that once protection to a pine stand is established, it will long remain so without future working of the area.

In 1930 an additional study was made of the growth of the seedlings of Ribes species of pines. This is a study of the relative susceptibility of these species to blight.

PLANTING AND CHECKING WORK

In October, 1930, a crew composed of members of the Washington Forestry School and several days on the following work: (1) planting 1,000 white pine transplants in the area (2) making a survey of the area on a 2-chain wide strip across the center of the area and on both sides of the exterior of each valley toward the stream; (3) eradicating the Ribes from the area and (4) checking and taking data on the condition of the area in 1931.

1. Planting

1,000 transplants, 1,000 seedlings of Ribes species of pines.

growing in this gravel-covered portion of the stream bed. There were found probably 30 B. viscosissima and 100 B. lineata. There were found 4 B. viscosissima. At the side of the stream bed results of the last observation are given. I would like to add that in the 1925 annual report on ecology work, page 103, the

In 1960 a careful examination of this man's skin showed only 4 stripes, all B. In 1961, one near the crown had white, one near the camp fire side, one near the tent side, and one at the middle end of the canoe. This constitutes another example of the poor survival of stripes needed. In this case, under state of over-rotation in 1960 and 1961, there was no survival of B. In 1962, and only a very small survival of B. In 1963.

2000

It is 1930 according to the date in the letter of the letter on
error in 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 260

PROGRESS REPORT ON CHEEKEYE PLOT STUDIES, 1930

of the plot. At a point 2 miles from the center of the plot, By L. I. Joy Junior Forester (around the circumference) and consisted of one row of each species planted 10 lines from the center and were 200 feet apart.

INTRODUCTION

After the discovery in 1922 of large quantities of white pine blister rust infection at Cheekeye, B. C., it was decided to establish a demonstration area in this vicinity where the activities of the disease could be studied under western conditions. In the spring of 1923 a circular plot with a 1,250-ft. radius was surveyed and the ribs within this area were eradicated. Disease free white pine transplants were then planted in three rows along each of the 8 radii laid out at 45-degree intervals from north.

Destruction of this plot by fire in the fall of 1925 necessitated its reestablishment in the spring of 1926. White pine transplants were again planted along the 8 radii this time one row along each instead of 3.

PURPOSE

This plot was established in order to determine the maximum distance white pine blister rust will spread from native ribs to western white pines under field conditions in the West. Two other subsidiary studies are: (1) the rate of killing by blister rust of young white pines, and (2) a determination of the survival of planted pines.

In 1930 an additional study was started with the planting on the plot of transplants of four species of pines. This is a study of the relative susceptibility of these species to blister rust.

WORK DONE AND RESULTS ACCOMPLISHED

In October, 1930, a crew composed of members of the permanent personnel spent several days on the following work: (1) planting 4,000 disease free white pine transplants on the area; (2) making a survey of the ribs on a 2-chain wide strip around the circumference of the plot and on both sides of the extension of each radius beyond the circumference; (3) eradicating the ribs from the plot; and (4) examining and taking data on the condition of pines planted in 1926.

A. Pine Planting

4,000 transplants, 1,000 each of Pinus lambertiana, P. monticola,

P. flexilis and P. strobus were planted in small blocks along each radius of the plot. At a point 2 chains from the plot center on the north, east, south and west radii, one unit of 40 pines, 10 of each species was planted. This was planted on the right side of each radius (when facing toward the circumference) and consisted of one row of each species started 10 links from the radius, with the pines and rows both spaced 5 links apart.

A second type of unit was planted at the 10, 15 and 20-chain points on each of the 8 radii except the southwest, west and east. Because of poor planting conditions at the 20-chain points on these three radii the unit for this point on the southwest was not planted, on the west was set at 27½ chains and on the east at 21 chains.

This second type of unit consists of a set of four blocks of pines, two on each side of the radius, planted along a line at right angles to the radius. The pines in each block were planted in 5 rows of 8 pines each spaced 5 links between both the pines and the rows. Each block is limited to one species of pine, the order from left to right (facing the circumference) being: (1) P. lambertiana, (2) P. monticola, (3) P. flexilis and (4) P. strobus. An interval of 10 links separates blocks 1 and 2 and blocks 3 and 4, but because of the older pines along each radius the interval between blocks 2 and 3 is 20 links.

As a check plot the balance of the transplants were planted in a unit along the Caribou Trail, southwest of Chisekye Lodge, 12 chains from the road. This unit consists of 30 P. lambertiana, 40 P. monticola, 19 P. flexilis and 25 P. strobus.

Diagrams No. 1 and 2, which follow, show the location of the pine susceptibility study units and the details of each type.

1. Thalassia and 2. Thalassia were planted in small blocks along with other plants. It is noted that the first number on the north side of the block was 10, and the rest of the block was 10 of each species was planted. This was planted on the right side of each section (from right to left) and consisted of one row of each species. It is noted that the plants were two feet apart.

3. Thalassia and 4. Thalassia were planted in small blocks along with other plants. It is noted that the first number on the north side of the block was 10, and the rest of the block was 10 of each species was planted. This was planted on the right side of each section (from right to left) and consisted of one row of each species. It is noted that the plants were two feet apart.

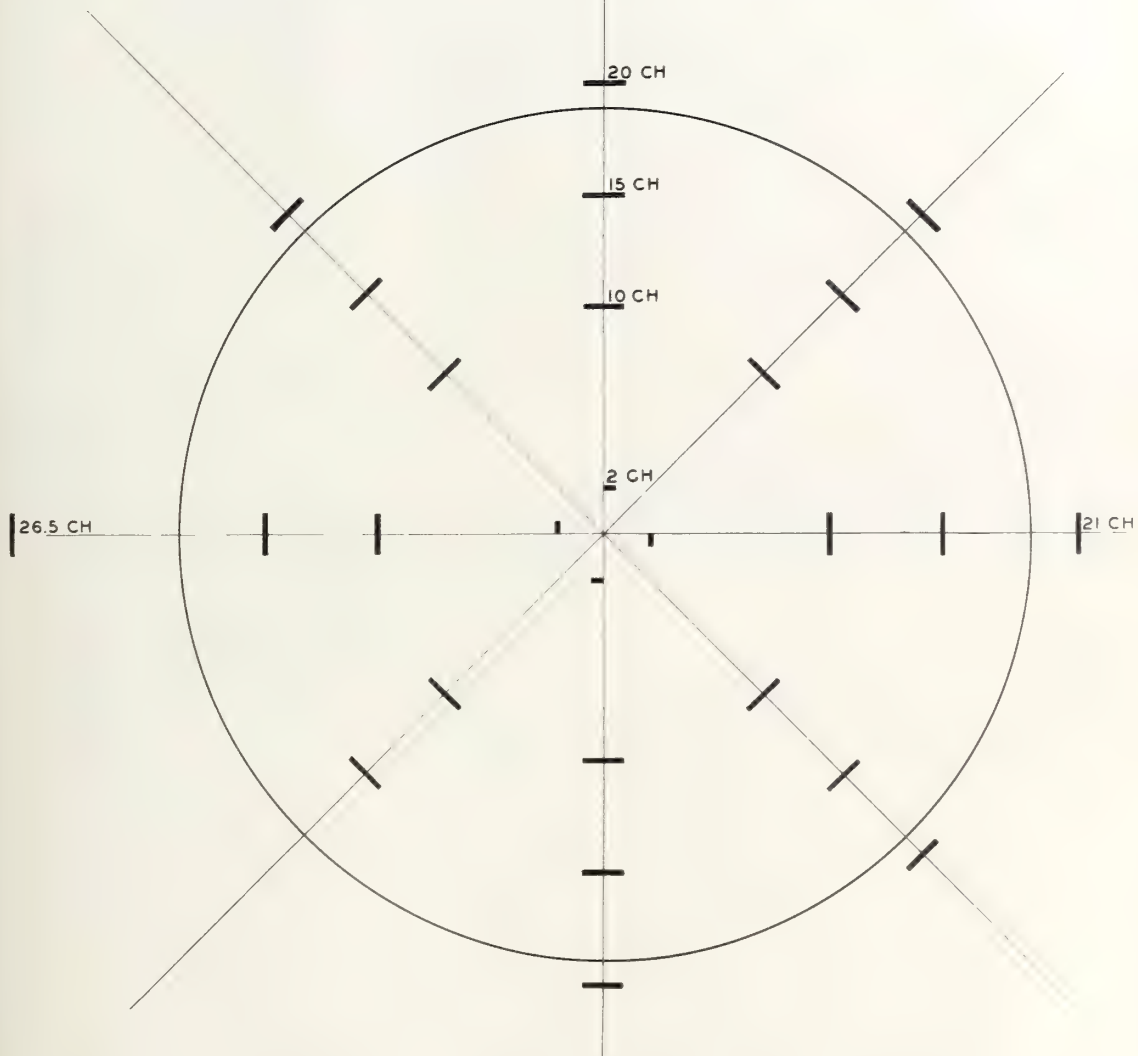
As a check plant the balance of the specimens were planted in a unit along the bottom front, southeast of the block. It is noted that the first number on the north side of the block was 10, and the rest of the block was 10 of each species was planted. This was planted on the right side of each section (from right to left) and consisted of one row of each species. It is noted that the plants were two feet apart.

Thalassia No. 1 and 2, which follow, show the location of the first specimens along with the labels of each type.

Thalassia No. 1 and 2, which follow, show the location of the first specimens along with the labels of each type.

Thalassia No. 1 and 2, which follow, show the location of the first specimens along with the labels of each type.

Diagram No. 1.



WILKINS, JR. ASSISTANT SURVEYOR, ALABAMA, B. L.

SHOWING LOCATION OF SUSCEPTIBILITY

STUDY PLOTS PLANTED IN 1900

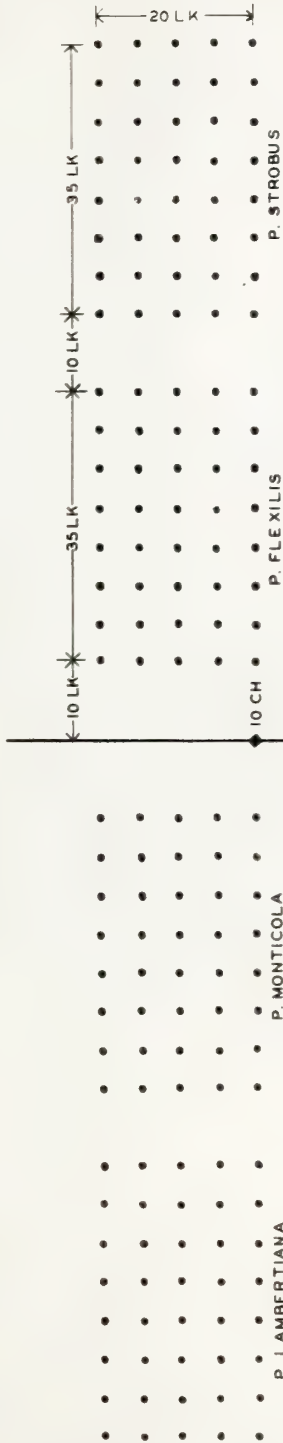
Drawn by E. L. Joy February 5, 1901

SCALE 1 INCH=4 CHAINS

0 1 2 3 4

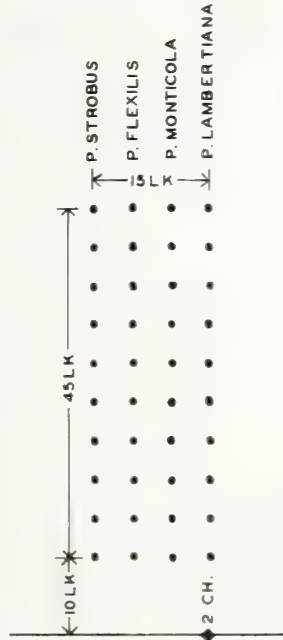
TYPE I

AT 10 15 AND 20 CHAIN POINTS ON EACH RADIUS



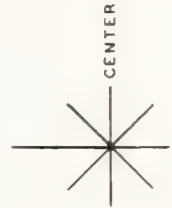
TYPE II

AT 2 CHAIN POINTS ON THE N E S AND W RADII



DETAILS OF PINE SUSCEPTIBILITY PLOTS

SCALE 1 INCH = 15 LINKS
DRAWN BY E L JOY
FEB 10 1931



B. Ribes Survey Around the Plot

A survey of the Ribes growing on a 2-chain wide strip adjacent to the circumference but outside the plot and on both sides of the extension of each radius was made. This survey was to determine the quantity of Ribes and their locations on this strip in an effort to correlate the amount of Ribes and the amount of infection on the pines in zones adjacent to these Ribes.

It is evident from the survey results that the Ribes growing on the 2-chain strip adjacent to the circumference of the plot and the radii extensions are not causing all or even the largest part of the infection. The results are too irregular and inconsistent to give any reasonable comparisons.

C. Eradication of Ribes from the Plot

Since the plot was not examined for Ribes in 1929, this work was done in 1930. A crew of men spaced about 1 rod apart covered the area by strips eradicating the Ribes bushes found within the circumference. Ribes were found at only two locations, one a R. lacustre 18 feet from the circumference on the west, and the other a group of R. sanguineum seedlings 80 feet from the circumference on the north.

D. Examination of the Planted Pines

1. Pine infection. The planted pines along the 8 radii and extensions were examined and data recorded as in previous years. These data are presented, as in 1928 and 1929, in Table No. 1 which shows the amount of infection in each of three zones which are: (1) the zone outside the circumference where the Ribes were not eradicated, (2) the protection zone or that strip 920 feet wide within the circumference, and (3) the area protected which is a circular area at the center having a 330-ft. radius.

| Zone | | 1928 | | 1929 | |
|----------|------|-----------|-----------|-----------|-----------|
| | | Area | Infection | Area | Infection |
| Zone | Area | Infection | Area | Infection | Area |
| | | | | | |
| Zone 1 | 1000 | 100 | 100 | 100 | 100 |
| Zone 2 | 1000 | 100 | 100 | 100 | 100 |
| Zone 3 | 1000 | 100 | 100 | 100 | 100 |
| Zone 4 | 1000 | 100 | 100 | 100 | 100 |
| Zone 5 | 1000 | 100 | 100 | 100 | 100 |
| Zone 6 | 1000 | 100 | 100 | 100 | 100 |
| Zone 7 | 1000 | 100 | 100 | 100 | 100 |
| Zone 8 | 1000 | 100 | 100 | 100 | 100 |
| Zone 9 | 1000 | 100 | 100 | 100 | 100 |
| Zone 10 | 1000 | 100 | 100 | 100 | 100 |
| Zone 11 | 1000 | 100 | 100 | 100 | 100 |
| Zone 12 | 1000 | 100 | 100 | 100 | 100 |
| Zone 13 | 1000 | 100 | 100 | 100 | 100 |
| Zone 14 | 1000 | 100 | 100 | 100 | 100 |
| Zone 15 | 1000 | 100 | 100 | 100 | 100 |
| Zone 16 | 1000 | 100 | 100 | 100 | 100 |
| Zone 17 | 1000 | 100 | 100 | 100 | 100 |
| Zone 18 | 1000 | 100 | 100 | 100 | 100 |
| Zone 19 | 1000 | 100 | 100 | 100 | 100 |
| Zone 20 | 1000 | 100 | 100 | 100 | 100 |
| Zone 21 | 1000 | 100 | 100 | 100 | 100 |
| Zone 22 | 1000 | 100 | 100 | 100 | 100 |
| Zone 23 | 1000 | 100 | 100 | 100 | 100 |
| Zone 24 | 1000 | 100 | 100 | 100 | 100 |
| Zone 25 | 1000 | 100 | 100 | 100 | 100 |
| Zone 26 | 1000 | 100 | 100 | 100 | 100 |
| Zone 27 | 1000 | 100 | 100 | 100 | 100 |
| Zone 28 | 1000 | 100 | 100 | 100 | 100 |
| Zone 29 | 1000 | 100 | 100 | 100 | 100 |
| Zone 30 | 1000 | 100 | 100 | 100 | 100 |
| Zone 31 | 1000 | 100 | 100 | 100 | 100 |
| Zone 32 | 1000 | 100 | 100 | 100 | 100 |
| Zone 33 | 1000 | 100 | 100 | 100 | 100 |
| Zone 34 | 1000 | 100 | 100 | 100 | 100 |
| Zone 35 | 1000 | 100 | 100 | 100 | 100 |
| Zone 36 | 1000 | 100 | 100 | 100 | 100 |
| Zone 37 | 1000 | 100 | 100 | 100 | 100 |
| Zone 38 | 1000 | 100 | 100 | 100 | 100 |
| Zone 39 | 1000 | 100 | 100 | 100 | 100 |
| Zone 40 | 1000 | 100 | 100 | 100 | 100 |
| Zone 41 | 1000 | 100 | 100 | 100 | 100 |
| Zone 42 | 1000 | 100 | 100 | 100 | 100 |
| Zone 43 | 1000 | 100 | 100 | 100 | 100 |
| Zone 44 | 1000 | 100 | 100 | 100 | 100 |
| Zone 45 | 1000 | 100 | 100 | 100 | 100 |
| Zone 46 | 1000 | 100 | 100 | 100 | 100 |
| Zone 47 | 1000 | 100 | 100 | 100 | 100 |
| Zone 48 | 1000 | 100 | 100 | 100 | 100 |
| Zone 49 | 1000 | 100 | 100 | 100 | 100 |
| Zone 50 | 1000 | 100 | 100 | 100 | 100 |
| Zone 51 | 1000 | 100 | 100 | 100 | 100 |
| Zone 52 | 1000 | 100 | 100 | 100 | 100 |
| Zone 53 | 1000 | 100 | 100 | 100 | 100 |
| Zone 54 | 1000 | 100 | 100 | 100 | 100 |
| Zone 55 | 1000 | 100 | 100 | 100 | 100 |
| Zone 56 | 1000 | 100 | 100 | 100 | 100 |
| Zone 57 | 1000 | 100 | 100 | 100 | 100 |
| Zone 58 | 1000 | 100 | 100 | 100 | 100 |
| Zone 59 | 1000 | 100 | 100 | 100 | 100 |
| Zone 60 | 1000 | 100 | 100 | 100 | 100 |
| Zone 61 | 1000 | 100 | 100 | 100 | 100 |
| Zone 62 | 1000 | 100 | 100 | 100 | 100 |
| Zone 63 | 1000 | 100 | 100 | 100 | 100 |
| Zone 64 | 1000 | 100 | 100 | 100 | 100 |
| Zone 65 | 1000 | 100 | 100 | 100 | 100 |
| Zone 66 | 1000 | 100 | 100 | 100 | 100 |
| Zone 67 | 1000 | 100 | 100 | 100 | 100 |
| Zone 68 | 1000 | 100 | 100 | 100 | 100 |
| Zone 69 | 1000 | 100 | 100 | 100 | 100 |
| Zone 70 | 1000 | 100 | 100 | 100 | 100 |
| Zone 71 | 1000 | 100 | 100 | 100 | 100 |
| Zone 72 | 1000 | 100 | 100 | 100 | 100 |
| Zone 73 | 1000 | 100 | 100 | 100 | 100 |
| Zone 74 | 1000 | 100 | 100 | 100 | 100 |
| Zone 75 | 1000 | 100 | 100 | 100 | 100 |
| Zone 76 | 1000 | 100 | 100 | 100 | 100 |
| Zone 77 | 1000 | 100 | 100 | 100 | 100 |
| Zone 78 | 1000 | 100 | 100 | 100 | 100 |
| Zone 79 | 1000 | 100 | 100 | 100 | 100 |
| Zone 80 | 1000 | 100 | 100 | 100 | 100 |
| Zone 81 | 1000 | 100 | 100 | 100 | 100 |
| Zone 82 | 1000 | 100 | 100 | 100 | 100 |
| Zone 83 | 1000 | 100 | 100 | 100 | 100 |
| Zone 84 | 1000 | 100 | 100 | 100 | 100 |
| Zone 85 | 1000 | 100 | 100 | 100 | 100 |
| Zone 86 | 1000 | 100 | 100 | 100 | 100 |
| Zone 87 | 1000 | 100 | 100 | 100 | 100 |
| Zone 88 | 1000 | 100 | 100 | 100 | 100 |
| Zone 89 | 1000 | 100 | 100 | 100 | 100 |
| Zone 90 | 1000 | 100 | 100 | 100 | 100 |
| Zone 91 | 1000 | 100 | 100 | 100 | 100 |
| Zone 92 | 1000 | 100 | 100 | 100 | 100 |
| Zone 93 | 1000 | 100 | 100 | 100 | 100 |
| Zone 94 | 1000 | 100 | 100 | 100 | 100 |
| Zone 95 | 1000 | 100 | 100 | 100 | 100 |
| Zone 96 | 1000 | 100 | 100 | 100 | 100 |
| Zone 97 | 1000 | 100 | 100 | 100 | 100 |
| Zone 98 | 1000 | 100 | 100 | 100 | 100 |
| Zone 99 | 1000 | 100 | 100 | 100 | 100 |
| Zone 100 | 1000 | 100 | 100 | 100 | 100 |

B. Ribes Survey Around the Plot

A survey of the Ribes growing on a 2-chain wide strip adjacent to the circumference of the plot was made on both sides of the extension of each radius was made. This survey was to determine the density of Ribes and their locations on this strip in an effort to correlate the amount of Ribes and the amount of infection on the pines in zones adjacent to these Ribes.

It is evident from the survey results that the Ribes growing on the 2-chain strip adjacent to the circumference of the plot and the radii extensions are not covering all or even the largest part of the infection. The results are too irregular and inconsistent to give any reasonable comparisons.

C. Eradication of Ribes from the Plot

Since the plot was not examined for Ribes in 1930, this work was done in 1930. A view of the Ribes growth around the plot was made by strips radiating from the Ribes bushes found within the circumference. Ribes were found at only two locations, one on the 18 foot from the circumference on the east, and the other a group of *A. angustatum* seedlings 15 feet from the circumference on the north.

D. Examination of the Planted Pines

1. Pine infection. The planted pines along the B radii and entire zone were examined and data recorded as in previous years. These data are presented, as in 1928 and 1929, in Table No. 1 which shows the amount of infection in each of three zones which are: (1) the zone outside the circumference where the Ribes were not eradicated, (2) the protection zone or that strip 250 feet wide within the circumference, and (3) the area protected which is a circular area at the center having a 250-ft. radius.

Contrary to the **TABLE NO. 1** the greatest increase in infection was found within the circle of the plot but it is not as high as the infection of the planted pines on the Cherry Plot, 1930.

| Radius | Per Cent Pines Infected | | | |
|-----------|-------------------------|--------------------------------|--|-------|
| | Outside Plot | Protection Zone (920-Ft. wide) | Area Protected Inner Circle (330-Ft. Radius) | Total |
| North | 23.20 | 17.79 | 13.87 | 20.26 |
| Northeast | 12.83 | 10.23 | 9.57 | 11.04 |
| East | 8.97 | 17.94 | 22.32 | 17.43 |
| Southeast | 10.34 | 14.01 | 16.15 | 13.31 |
| South | 0.00 | 10.04 | 7.61 | 7.79 |
| Southwest | 13.04 | 13.57 | 8.80 | 12.45 |
| West | 10.17 | 18.18 | 20.00 | 17.41 |
| Northwest | 16.67 | 21.65 | 15.21 | 16.54 |
| All radii | 14.85 | 15.72 | 14.01 | 15.13 |

An examination of Table No. 1 brings out quite definitely the fact that no appreciable protection from blister rust has been afforded the pines on the plot by the eradication of the alders therefrom.

2. **Comparison of the 1930 results with those of 1929, 1928 and 1927** shows a decided increase in the amount of infection both on and off the plot. This is displayed in Table No. 2 which follows:

TABLE NO. 2

COMPARISON OF PINE INFECTION ON THE CHERRY PLOT BY ZONTS, 1927-1930

| Year Examined | Per Cent Pines Infected | | | |
|---------------------|-------------------------|------------------------------------|---|-------|
| | Outside Plot | Protection Zone (920-Ft. in width) | Area Protected (Inner Circle With 330-Ft. Radius) | Total |
| 1927 | 1.3 | 1.1 | 1.4 | 1.3 |
| 1928 | 5.5 | 6.4 | 5.1 | 5.9 |
| 1929 | 8.5 | 8.2 | 7.3 | 8.1 |
| 1930 | 14.9 | 15.7 | 14.0 | 15.1 |
| Increase, 1927-1928 | 4.2 | 5.3 | 3.7 | 4.7 |
| Increase, 1928-1929 | 3.0 | 1.8 | 2.2 | 2.3 |
| Increase, 1929-1930 | 6.4 | 7.5 | 6.7 | 7.0 |
| Increase, 1927-1930 | 13.6 | 14.6 | 12.6 | 13.9 |

IMPACT OF THE 1950-51 FLOOD ON THE FISH AND WILDLIFE RESOURCES OF THE GANGES

| Year | Flooded Area (sq. miles) | | Flooded Area (sq. miles) | |
|---------|--------------------------|------------|--------------------------|------------|
| | Pre-flood | Post-flood | Pre-flood | Post-flood |
| 1950-51 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1951-52 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1952-53 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1953-54 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1954-55 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1955-56 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1956-57 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1957-58 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1958-59 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1959-60 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1960-61 | 10.0 | 10.0 | 10.0 | 10.0 |

The impact of the 1950-51 flood on the fish and wildlife resources of the Ganges is shown in the following table. The table shows the number of fish and wildlife species that were affected by the flood, and the number of fish and wildlife species that were not affected by the flood.

A comparison of the fish and wildlife resources of the Ganges in 1950-51 and 1951-52 is shown in the following table. The table shows the number of fish and wildlife species that were affected by the flood, and the number of fish and wildlife species that were not affected by the flood.

TABLE NO. 2 shows the number of fish and wildlife species that were affected by the flood, and the number of fish and wildlife species that were not affected by the flood.

COMPARISON OF THE IMPACT OF THE 1950-51 FLOOD ON THE FISH AND WILDLIFE RESOURCES OF THE GANGES

| Year | Flooded Area (sq. miles) | | Flooded Area (sq. miles) | |
|---------|--------------------------|------------|--------------------------|------------|
| | Pre-flood | Post-flood | Pre-flood | Post-flood |
| 1950-51 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1951-52 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1952-53 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1953-54 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1954-55 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1955-56 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1956-57 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1957-58 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1958-59 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1959-60 | 10.0 | 10.0 | 10.0 | 10.0 |
| 1960-61 | 10.0 | 10.0 | 10.0 | 10.0 |

Contrary to the 1929 results the greatest increase in 1930 was found within the circumference of the plot but in no case is there any great difference in the amount of infection per zone. This, coupled with the fact that the largest amount of infection was found on the north, northwest and west radii indicates that it is very probable that the source of pine-infecting spores is a large quantity of ribes north to northwest of the plot. Scouting in this direction revealed the information that R. bracteosum, R. sanguineum and R. lacustre are moderately abundant along the Cheakamus River to its mouth and thence along the Squamish River and in the wide alluvial flat adjacent to these rivers. No ribes were found on the burned-over area between the plot and the river flat. The near edge of the flat is three-quarters of a mile and the rivers are one mile northwest of the center of the plot.

If the major source of the sporidia is three-quarters of a mile to one mile from the center of the plot, wind must be a very important factor in the transportation of these spores. It is very probable that the winds blowing in a southerly direction down the wide Squamish Valley fan out in a southeasterly direction at the mouth of the Cheakamus River and carry large quantities of spores to the plot across the open, burned-over area intervening. If this is the case, it is probable that eradication of all the ribes for at least one mile from the circumference of the Cheakye plot would be necessary before the pines on the plot would be protected.

2. Death of pines from blister rust. As early as 1929 it was observed that a few of the infected pines had been killed by blister rust. In 1929, 33 years after the pines were planted, this kill amounted to 12.8 per cent of the infected pines or one per cent of the total number of pines examined.

Analysis of the 1930 data shows 16.2 per cent of the infected pines killed by the disease, an increase of 3.4 per cent over the figures for 1929. This amounts to 2.8 per cent of the total number of pines examined or an increase over 1929 of 1.8 per cent.

3. Normal survival of planted pines. In the fall of 1930 the surviving pines totaled 81.48 per cent of the number planted 4 years before in the spring of 1926. Of the 18.51 per cent mortality in these 4 years, 14.42 per cent occurred the first year and 16.76 per cent the first two years.

CONCLUSION

In 1928 it was determined that a 1,250-ft. strip was not sufficient for the protection of white pine from blister rust under the conditions existing at Cheekye. In 1930, a survey of the Ribes conditions in the vicinity of the plot revealed the fact that the major source of pine-infecting spores is probably along the Cheakamus and Squamish rivers $\frac{3}{4}$ ths to 1 mile northwest of the plot center. Thus, it is probable that at least a one-mile-wide protection zone would be needed at Cheekye and in comparable regions before the pines would be protected.

The data from the 1930 survey of the Ribes conditions in the vicinity of the plot are summarized in Table 1. The data are in regions of abundant Ribes.

The two plots were established for the purpose of determining the relative susceptibility to blister rust of *P. maritima* and *P. strobus* when growing under western conditions.

DISCUSSION OF RESULTS

In 1930 complete data were taken on all cankers found on both plots. However, data on the numerous cankers in western *P. maritima* are limited. It was only possible to take data on the cankers of previously recorded cankers and on a few others on the basis of photographs taken in 1930.

The relative susceptibility of the two species of pine as determined from the 1930 data is indicated in Table 2. This table shows that the number of cankers per infected tree for *P. maritima* is greater than that for *P. strobus*. This indicates a higher relative susceptibility for *P. maritima* than for *P. strobus*. However, for *P. maritima* trees, the number of the plot, and the number of trees per plot had had on the 1930 cankers found, it is apparent that the number of cankers per infected tree for *P. maritima* is not accurate.

Of unusual interest is the *P. strobus* tree with 141 cankers. In 1928 it had 4 cankers and in 1930 only 20. Interpreted as it is in the case course of infection in the other trees of the plot, it is evident that this tree is more susceptible to blister rust than the average *P. strobus*.

On 12 June 1951, the first of a series of meetings was held between the representatives of the United States and the Chinese Communists. The purpose of these meetings was to discuss the possibility of a truce in the Korean War. The Chinese Communists proposed a truce that would require the United States to withdraw its troops from North Korea. The United States refused this proposal, stating that it was not in a position to negotiate with the Chinese Communists until they had first agreed to a ceasefire. The meetings continued for several days, but no agreement was reached. The Chinese Communists then announced that they had decided to continue the war. The United States then announced that it was prepared to negotiate a truce with the Chinese Communists, provided that they agreed to a ceasefire first. The Chinese Communists agreed to this proposal, and a truce was signed on 27 July 1951. The truce provided for a ceasefire in North Korea, and for the withdrawal of Chinese troops from North Korea. The United States agreed to withdraw its troops from North Korea, and to allow the Chinese Communists to remain in North Korea. The truce was a significant step towards the resolution of the Korean War, but it did not end the war. The war continued for several more years, and it was not until 1953 that a final agreement was reached. The final agreement provided for a ceasefire in North Korea, and for the withdrawal of Chinese troops from North Korea. The United States agreed to withdraw its troops from North Korea, and to allow the Chinese Communists to remain in North Korea. The final agreement was a significant step towards the resolution of the Korean War, but it did not end the war. The war continued for several more years, and it was not until 1953 that a final agreement was reached.

PROGRESS REPORT ON STUDIES OF THE RELATIVE SUSCEPTIBILITY OF PINUS
MONTICOLA AND P. STROBUS GROWING UNDER WESTERN CONDITIONS - 1930

By
T. L. Joy,
Junior Forester

INTRODUCTION

In the spring of 1928 two plots were established in western Washington on which both Pinus monticola and P. strobus were growing. On the Fysht plot the pines are in three rows having grown from seed planted in 1915 by Mr. Merrill of the Merrill Lumber Company. The Buck Creek plot is in a 1910 Forest Service planting area which was partially burned over in 1914. Both plots are in regions of abundant moisture.

PURPOSE

The two plots were established for the purpose of determining the relative susceptibility to blister rust of P. monticola and P. strobus when growing under western conditions.

DATA OBTAINED AND RESULTS OBTAINED

In 1930 complete data were taken on all cankers found at Fysht. However, owing to the enormous increase in number of cankers and the limited time available it was only possible at Buck Creek to take the data on previously recorded cankers and to classify others on the basis of year of growth infected and stage of canker development.

The relative susceptibility of the two species of pine as determined from the 1930 data is indicated in Table No. 1. This table shows that the number of cankers per infected tree for P. strobus on the Fysht plot is greater than that for P. monticola, indicating a higher relative susceptibility for P. strobus than for P. monticola. Because only 5 P. strobus trees, the number on the plot, are used for this study and one of these had 151 of the 196 cankers found, it is apparent that the "number of cankers per infected tree" basis of comparison is not accurate.

Of unusual interest is the P. strobus tree with 151 cankers. In 1928 it had 4 cankers and in 1929 only 35. Suspected as it is to the same source of sporidia as the other trees on the plot, it is evident that this tree is more susceptible to blister rust than the average P. strobus.

RESEARCH REPORT ON STUDIES OF THE RELATIVE SUSCEPTIBILITY OF PINES
MONTICOLA AND P. STROBUS TO WESTERN CONIFER WILKES - 1930

E. I. JOY,

Junior Forester

SYNOPSIS

In the spring of 1928 two plots were established in western Washington on which *Monticola* and *P. strobus* were planted. On the plots of *P. strobus* there were three rows of trees each 100 feet long and 10 feet apart. The results of the study of the relative susceptibility of the two species of pines to the western conifer wilk are given in this report. The results show that *P. strobus* is more susceptible to the wilk than *Monticola*. The results also show that the wilk is more prevalent on the plots of *P. strobus* than on the plots of *Monticola*.

PURPOSE

The two plots were established for the purpose of determining the relative susceptibility to blight of *P. monticola* and *P. strobus* when growing under western conditions.

THE DATA AND THEIR SIGNIFICANCE

In 1928 complete data were given on all samples taken at the plots. However, owing to the enormous increase in number of samples and the limited time available it was only possible at Rock Creek to take the data on previously recorded samples and to classify others on the basis of year of growth infected and stage of cancer development.

The relative susceptibility of the two species of pines as determined from the 1928 data is indicated in Table No. 1. This table shows that the number of cancers per infected tree for *P. strobus* on the plot is greater than for *P. monticola*, indicating a higher relative susceptibility for *P. strobus* than for *P. monticola*. Because only *P. strobus* trees were planted on the plot, the data for this study and one of those of the 1928 cancer survey, it is apparent that the number of cancers per infected tree, basis of susceptibility is not accurate.

Of unusual interest is the *P. strobus* tree which had cancers. In 1928 it had 4 cancers and in 1929 only 2. Suspected as it is to the same source of spores as the other trees on the plot, it is evident that this tree is more susceptible to blight than the average *P. strobus*.

TABLE NO. 1

COMPARISON OF THE AMOUNT OF INFECTION ON *P. MONTICOLA* AND *P. STROBUS*, BUCK CREEK AND FYSHT PLOTS - 1930

| Plot | Pine Species | No. of Trees | | Per Cent Trees Infected | No. Cankers Per | | Number Cankers Per M. F.M.S. |
|----------------|---------------------|--------------|----------|-------------------------|-----------------|--------------|------------------------------|
| | | Examined | Infected | | Infected Tree | Average Tree | |
| Buck Creek | <i>P. monticola</i> | 70* | 62 | 88.6 | 80.8 | 71.6 | 141.0 |
| | <i>P. strobus</i> | 4** | 3 | 75.0 | 5.3 | 4.0 | 6.5 |
| Fysht | <i>P. monticola</i> | 74 | 70 | 94.6 | 26.9 | 25.4 | 71.0 |
| | <i>P. strobus</i> | 5 | 5 | 100.0 | 38.2 | 39.2 | 18.7 |
| Combined Plots | <i>P. monticola</i> | 144 | 132 | 91.7 | 52.2 | 47.9 | 111.1 |
| | <i>P. strobus</i> | 9 | 8 | 88.9 | 26.5 | 23.6 | 14.2 |

*Originally 72. 1 destroyed, 1 too large to inspect.

**Originally 5. 1 destroyed.

Using one thousand feet of needle stem as the basis for comparison, the results from a combination of the trees of both plots indicate that in the West *P. monticola* is 7.8 times as susceptible as *P. strobus*. In 1928 this rate was determined as 8.9 and in 1925 as 5.7. The data obtained in 1930 include practically all the cankers formed from the probable year of origin, 1925, to and including those formed in 1927 and many of those started in 1928. Therefore, the 1930 results indicate the relative susceptibility of the two species after approximately the first five years of subjection to the disease.

CONCLUSION

In order to determine the actual relative susceptibility of these two species, additional susceptibility determinations must be made from data taken annually. When these determinations approach a constant figure the actual relative susceptibility of *P. monticola* and *P. strobus* under western conditions will have been determined.

PROGRESS REPORT ON BUDWORM AND INSECTION STUDY, NEWMAN LAKE, WASHINGTON

live stem per acre. The stand 1930. set in May 1929 there were removed
By
time over during the study. E. E. Myers and E. J. Myers were
and removed at the rate of one Agent of live stem per acre. This
naturally sign surveys in 1929. E. J. Myers of 1929 and 1930. It
probably the chief to the PURPOSE (1) the general survey of
of the present work of the project, located in infection and all
The purpose of Newman Lake infection plot is to study the
effect of Ribes lacustre as a factor in the intensification and spread of
white pine blister rust where the disease is well established.

LOCATION

The plot is located 26 miles northeast of Spokane, Washington
in townships 26 and 27 north, range 5 east, sections 4, 5, 32 and 33.

WORK DONE PREVIOUS TO 1930

White pine blister rust was found on this area May 10, 1928.
Thorough scouting of the general region was done that same year. No
other infected areas were found in the vicinity of Newman Lake.

Necessary surveys and maps were made of the area selected for
the study during the late autumn of 1928. During the spring of 1929 the
area was subdivided into 1-chain-square blocks. Eradication of E. inermis
was done in two operations, one on May 6 to 8, 1929 and the second two
weeks later. Infection data and locations of all white pines and R.
lacustre on the plot were recorded during the period May 10 to August
25, 1929. All E. inermis bushes found during this period were eradicated.

WORK DONE 1930

The plot was again gone over for E. inermis on May 6 and 7, 1930,
and all bushes found were destroyed. In the course of work on the plot
during the summer missed R. inermis bushes found were eradicated.

The plot boundaries were extended east and south to include
10.8 acres additional area increasing the size of the plot to 36.2 acres.
Data were recorded on pines and R. lacustre on the entire 36.2 acres.

Relative humidity readings taken with a sling psychrometer were
recorded three or four times per day during the summer season.

A. Removal of E. inermis

In each of the successive eradications of E. inermis from the

1. The purpose of this investigation is to determine the effect of the use of the word "and" in the title of a document on the results of a search.

2. The purpose of this investigation is to determine the effect of the use of the word "and" in the title of a document on the results of a search.

3. RESULTS

The purpose of this investigation is to determine the effect of the use of the word "and" in the title of a document on the results of a search. The results of the investigation are as follows:

4. CONCLUSION

The results of the investigation are as follows: The use of the word "and" in the title of a document has a significant effect on the results of a search.

5. WORK DONE PREVIOUS TO 1930

The purpose of this investigation is to determine the effect of the use of the word "and" in the title of a document on the results of a search. The results of the investigation are as follows:

The purpose of this investigation is to determine the effect of the use of the word "and" in the title of a document on the results of a search. The results of the investigation are as follows:

6. WORK DONE SINCE 1930

The purpose of this investigation is to determine the effect of the use of the word "and" in the title of a document on the results of a search. The results of the investigation are as follows:

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7. Acknowledgment of A. J. J. J.

The purpose of this investigation is to determine the effect of the use of the word "and" in the title of a document on the results of a search. The results of the investigation are as follows:

plot there has been a very definite and material reduction in feet of live stem per acre. The first time over in May 1929 there were removed 2,698 feet of live stem of R. inerme per acre. In the final and fifth time over during the summer season of 1930 R. inerme bushes were found and removed at the rate of only 3 feet of live stem per acre. This unusually high success in removing R. inerme by hand eradication is probably due chiefly to two factors; (1) the personnel employed consisted of the permanent members of the office, leaders in eradication and allied projects, and (2) the work was done early in the season when R. inerme was leaved out and plainly visible against the still unleaved branches of associated brush.

Careful observations of all R. inerme eradicated since 1929 have been made and no trace of infection has been found. The major portion of the eradication work has been done in the spring before time for infection to show on the Ribes leaves.

B. Ribes lacustre Information

In Table No. 1 is shown a comparison of the amounts of R. lacustre present on the plot in 1929 and 1930.

TABLE NO. 1

AMOUNT OF R. LACUSTRE ON WETMAN LAKE INFECTION PLOT - 1929 AND 1930

| Year | Number of Acres | Totals on Plot | | | | Per Acre | | Average F.L.S. Per Bush |
|------|-----------------|----------------|--------|-----------|-------------------------------|----------|--------|-------------------------|
| | | Bushes | F.L.S. | Leaves | Absolute* Area in Square Feet | Bushes | F.L.S. | |
| 1929 | 25.4 | 537 | 53,791 | 1,233,333 | 2,719 | 22 | 2,113 | 26 |
| 1930 | 35.2 | 592 | 20,008 | 350,614 | 1,356 | 16 | 551 | 35 |

*By "absolute area" is meant the theoretical area on the ground taken up by the Ribes bushes if they were concentrated to a 100 per cent density. It is the product of the actual ground area of a bush and its estimated density in tenths.

An examination of Table No. 1 discloses the fact that apparently there was a very large reduction in the amount of R. lacustre in 1930 over what it was in 1929. An examination of the original data sheets showed that there were appreciable amounts of dead stem in 1930 that were alive in 1929. There were 12 R. lacustre bushes completely dead in 1930 which were alive in 1929.

plot there has been a very definite and marked reduction in loss of live deer per acre. The first time that in 1939 there were removed 5,248 feet of live deer of E. leucurus per acre. In the first and third time over during the summer months of 1939 E. leucurus bushes were found and removed at the rate of only 5 feet of live deer per acre. This unusually high success in removing E. leucurus by hand weeding is probably due chiefly to two factors: (1) the extremely high percentage of the permanent members of the station, including its collection and all other objects, and (2) the fact that only in the summer months E. leucurus was removed and during winter months a still smaller number of associated brush.

Careful observations of all E. leucurus collected since 1939 have been made and no change of behavior has been found. The major portion of the eradication work has been done in the winter before the first infection is seen on the winter leaves.

E. leucurus Eradication

In Table No. 1 is shown a comparison of the amount of E. leucurus present on the plot in 1939 and 1930.

TABLE NO. 1

AMOUNT OF E. leucurus on the plot in 1939 and 1930

| Year | Number of bushes removed | Total of live deer | | Total of live deer | | Average per acre |
|------|--------------------------|--------------------|-------|--------------------|-------|------------------|
| | | 1939 | 1930 | 1939 | 1930 | |
| 1939 | 52.4 | 5,248 | 1,100 | 5,248 | 1,100 | 52.4 |
| 1930 | 52.4 | 5,248 | 1,100 | 5,248 | 1,100 | 52.4 |

very noticeable result is that the percentage of live deer on the ground removed by the first cutting of live deer was considerably less in 1939 than in 1930. It is the product of the removal of live deer from the plot and the reduction in density in bushes. An examination of Table No. 1 discloses the fact that although there was a very large reduction in the amount of E. leucurus in 1939 over what it was in 1930. An examination of the original data shows that there were a considerable number of live deer in 1930 that were alive in 1939. There were in E. leucurus bushes completely dead in 1930 which were alive in 1939.

This heavy shrinking in amount of R. lacustre in 1930 from what it was in 1929 was apparently due in large measure to the dry conditions in 1929. The human element of estimation of live stem was undoubtedly a factor. However, the same man worked on the plot and took the data in both years, and his errors should be largely compensating.

In Table No. 2 there is shown the amount of R. lacustre infection in 1929 and 1930.

TABLE NO. 2
COMPARATIVE AMOUNTS OF INFECTION ON R. LACUSTRE 1929 AND 1930. HUMAN
LACUS INFECTION PLOT

| Year | Number of Fruiting Cankers | Number of Bushes Infected | Per Cent of Bushes Infected | Number of Infected Leaves | Equivalent Number of Leaves* 100 per Cent Infected | | | |
|------|----------------------------|---------------------------|-----------------------------|---------------------------|--|-------|----------------|-----------------|
| | | | | | Uredinia | Telia | Necrotic Areas | Total Infection |
| 1929 | 27 | 6 | 1.1 | 77 | 0.07 | 0.02 | 0.76 | 0.85 |
| 1930 | 257 | 62 | 10.7 | 979 | 20.00 | 31.22 | 7.00 | 58.22 |

*By the term "Equivalent number of leaves 100 per cent infected" is meant the number of leaves 100 per cent infected if all the infected leaf surfaces were concentrated.

It is apparent in Table No. 2 that there was a large increase in the amount of R. lacustre infection in 1930 over what it was in 1929, particularly in the production of telia.

The numbers of fruiting cankers are shown in the Ribes infection table because they constitute a rough measure of the amount of aecia to which the Ribes were exposed.

In order to obtain a better picture of the amount of Ribes infection on the plot in 1929 and 1930 the data in Table No. 2 are shown in Table No. 3, as ratios of 1929 values to those of 1930.

It is noted that in 1933 the number of infected leaves was 1.1 per cent. This was a very low figure, especially in view of the fact that in 1932 the number of infected leaves was 1.1 per cent. The reason for this is that in 1932 the number of infected leaves was 1.1 per cent. However, the same was noted in 1933 and 1934. In both years the virus could be easily transmitted.

In Table No. 2 there is shown the number of infected leaves in 1933 and 1934. It is seen that in 1933 the number of infected leaves was 1.1 per cent. In 1934 the number of infected leaves was 1.1 per cent.

TABLE NO. 2

COMPARATIVE NUMBER OF INFECTED LEAVES OF A. LINGULATA 1933 AND 1934, NEWARK

| Year | Number of Infected Leaves | Number of Infected Leaves | Number of Infected Leaves | Number of Infected Leaves | Number of Infected Leaves | Number of Infected Leaves |
|------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| 1933 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 1934 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |

By the term "percentage number of leaves 100 per cent infected" is meant the number of leaves 100 per cent infected. It is seen that in 1933 the number of leaves 100 per cent infected was 1.1 per cent. In 1934 the number of leaves 100 per cent infected was 1.1 per cent.

It is apparent in Table No. 2 that there was a large increase in the number of infected leaves in 1933 over what it was in 1932. This is particularly in the number of leaves.

The number of infected leaves was shown in the 1933 infection table. It is seen that in 1933 the number of infected leaves was 1.1 per cent. This was a very low figure, especially in view of the fact that in 1932 the number of infected leaves was 1.1 per cent. The reason for this is that in 1932 the number of infected leaves was 1.1 per cent. However, the same was noted in 1933 and 1934. In both years the virus could be easily transmitted.

In order to obtain a better picture of the number of leaves infected in 1933 and 1934 the data in Table No. 2 are shown. It is seen that in 1933 the number of infected leaves was 1.1 per cent. In 1934 the number of infected leaves was 1.1 per cent.

There was a very large increase in the number of infected leaves in 1933 over what it was in 1932. This is particularly in the number of leaves. It is seen that in 1933 the number of infected leaves was 1.1 per cent. In 1934 the number of infected leaves was 1.1 per cent.

TABLE NO. 3

RATIOS OF DIFFERENT STAGES OF R. LACUSTRE INFECTION IN 1929 TO
THOSE IN 1930 AERMAN WARE INSECTIVE PLOT

| Class of Data | Ratios | |
|--|--------|---------|
| | 1929 | 1930 |
| Number of cankers producing spores | 1 | 9.5 |
| Number of infected R. lacustre bushes | 1 | 10.3 |
| Number of infected R. lacustre leaves, total | 1 | 12.7 |
| Equivalent number of leaves 100 per cent infected - uredinia | 1 | 385.7 |
| Equivalent number of leaves 100 per cent infected - telia | 1 | 1,550.0 |
| Equivalent number of leaves 100 per cent infected - necrotic areas | 1 | 9.2 |
| Equivalent number of leaves 100 per cent infected - all stages | 1 | 68.2 |

of 1930 being psychrometer readings of relative humidity were taken on the plot.

The information in Table No. 3 is most interesting. It may be observed that the ratio of values in 1929 to 1930 is quite similar in the cases of fruiting cankers, infected bushes, and infected leaves. In other words, apparently in this instance, the number of bushes infected and number of leaves infected seem quite dependent upon the amount of spores present. However, when the infection per infected leaf, represented as the equivalent number of leaves 100 per cent infected is considered, this ratio is very largely ignored, and the 1930 portion of the ratio greatly increased. This situation would mean that there was much greater activity of the rust within the leaf tissues in 1930 than in 1929. In other words, it seems that the number of bushes and leaves infected is dependent upon the spore source but that the amount of infection per infected leaf and the type of infection were more dependent upon some other factor or factors, possibly environmental in nature. Factors of local climate and soil fertility, plant age and condition, and the time of day and season of infection are all factors which may be considered.

It is well known that conditions of high relative humidity favor rust activity. Moisture conditions were generally more favorable for rust development in the Inland Empire in 1930 than in 1929. In a publication prepared by the Spokane office of the Weather Bureau entitled: "A Summary of Fire Weather Records for the Season of 1930", Francis C. Crombie states (page 1, paragraph 2): "Precipitation . . . was especially kind to this district this past season. . . . The real significance of this season's precipitation will be found to be its distribution in point of time. The decade precipitation being of such amounts and so nicely timed that the forests were kept in a comparatively safe condition throughout the season".

1. The first part of the document is a list of names and dates, which appears to be a roster or a list of participants. The names are written in a cursive script, and the dates are written in a more formal, printed style. The list is organized into two columns, with names on the left and dates on the right.

| 2012 | | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 | 1995 | 1994 | 1993 | 1992 | 1991 | 1990 | 1989 | 1988 | 1987 | 1986 | 1985 | 1984 | 1983 | 1982 | 1981 | 1980 | 1979 | 1978 | 1977 | 1976 | 1975 | 1974 | 1973 | 1972 | 1971 | 1970 | 1969 | 1968 | 1967 | 1966 | 1965 | 1964 | 1963 | 1962 | 1961 | 1960 | 1959 | 1958 | 1957 | 1956 | 1955 | 1954 | 1953 | 1952 | 1951 | 1950 | 1949 | 1948 | 1947 | 1946 | 1945 | 1944 | 1943 | 1942 | 1941 | 1940 | 1939 | 1938 | 1937 | 1936 | 1935 | 1934 | 1933 | 1932 | 1931 | 1930 | 1929 | 1928 | 1927 | 1926 | 1925 | 1924 | 1923 | 1922 | 1921 | 1920 | 1919 | 1918 | 1917 | 1916 | 1915 | 1914 | 1913 | 1912 | 1911 | 1910 | 1909 | 1908 | 1907 | 1906 | 1905 | 1904 | 1903 | 1902 | 1901 | 1900 | 1899 | 1898 | 1897 | 1896 | 1895 | 1894 | 1893 | 1892 | 1891 | 1890 | 1889 | 1888 | 1887 | 1886 | 1885 | 1884 | 1883 | 1882 | 1881 | 1880 | 1879 | 1878 | 1877 | 1876 | 1875 | 1874 | 1873 | 1872 | 1871 | 1870 | 1869 | 1868 | 1867 | 1866 | 1865 | 1864 | 1863 | 1862 | 1861 | 1860 | 1859 | 1858 | 1857 | 1856 | 1855 | 1854 | 1853 | 1852 | 1851 | 1850 | 1849 | 1848 | 1847 | 1846 | 1845 | 1844 | 1843 | 1842 | 1841 | 1840 | 1839 | 1838 | 1837 | 1836 | 1835 | 1834 | 1833 | 1832 | 1831 | 1830 | 1829 | 1828 | 1827 | 1826 | 1825 | 1824 | 1823 | 1822 | 1821 | 1820 | 1819 | 1818 | 1817 | 1816 | 1815 | 1814 | 1813 | 1812 | 1811 | 1810 | 1809 | 1808 | 1807 | 1806 | 1805 | 1804 | 1803 | 1802 | 1801 | 1800 | 1799 | 1798 | 1797 | 1796 | 1795 | 1794 | 1793 | 1792 | 1791 | 1790 | 1789 | 1788 | 1787 | 1786 | 1785 | 1784 | 1783 | 1782 | 1781 | 1780 | 1779 | 1778 | 1777 | 1776 | 1775 | 1774 | 1773 | 1772 | 1771 | 1770 | 1769 | 1768 | 1767 | 1766 | 1765 | 1764 | 1763 | 1762 | 1761 | 1760 | 1759 | 1758 | 1757 | 1756 | 1755 | 1754 | 1753 | 1752 | 1751 | 1750 | 1749 | 1748 | 1747 | 1746 | 1745 | 1744 | 1743 | 1742 | 1741 | 1740 | 1739 | 1738 | 1737 | 1736 | 1735 | 1734 | 1733 | 1732 | 1731 | 1730 | 1729 | 1728 | 1727 | 1726 | 1725 | 1724 | 1723 | 1722 | 1721 | 1720 | 1719 | 1718 | 1717 | 1716 | 1715 | 1714 | 1713 | 1712 | 1711 | 1710 | 1709 | 1708 | 1707 | 1706 | 1705 | 1704 | 1703 | 1702 | 1701 | 1700 | 1699 | 1698 | 1697 | 1696 | 1695 | 1694 | 1693 | 1692 | 1691 | 1690 | 1689 | 1688 | 1687 | 1686 | 1685 | 1684 | 1683 | 1682 | 1681 | 1680 | 1679 | 1678 | 1677 | 1676 | 1675 | 1674 | 1673 | 1672 | 1671 | 1670 | 1669 | 1668 | 1667 | 1666 | 1665 | 1664 | 1663 | 1662 | 1661 | 1660 | 1659 | 1658 | 1657 | 1656 | 1655 | 1654 | 1653 | 1652 | 1651 | 1650 | 1649 | 1648 | 1647 | 1646 | 1645 | 1644 | 1643 | 1642 | 1641 | 1640 | 1639 | 1638 | 1637 | 1636 | 1635 | 1634 | 1633 | 1632 | 1631 | 1630 | 1629 | 1628 | 1627 | 1626 | 1625 | 1624 | 1623 | 1622 | 1621 | 1620 | 1619 | 1618 | 1617 | 1616 | 1615 | 1614 | 1613 | 1612 | 1611 | 1610 | 1609 | 1608 | 1607 | 1606 | 1605 | 1604 | 1603 | 1602 | 1601 | 1600 | 1599 | 1598 | 1597 | 1596 | 1595 | 1594 | 1593 | 1592 | 1591 | 1590 | 1589 | 1588 | 1587 | 1586 | 1585 | 1584 | 1583 | 1582 | 1581 | 1580 | 1579 | 1578 | 1577 | 1576 | 1575 | 1574 | 1573 | 1572 | 1571 | 1570 | 1569 | 1568 | 1567 | 1566 | 1565 | 1564 | 1563 | 1562 | 1561 | 1560 | 1559 | 1558 | 1557 | 1556 | 1555 | 1554 | 1553 | 1552 | 1551 | 1550 | 1549 | 1548 | 1547 | 1546 | 1545 | 1544 | 1543 | 1542 | 1541 | 1540 | 1539 | 1538 | 1537 | 1536 | 1535 | 1534 | 1533 | 1532 | 1531 | 1530 | 1529 | 1528 | 1527 | 1526 | 1525 | 1524 | 1523 | 1522 | 1521 | 1520 | 1519 | 1518 | 1517 | 1516 | 1515 | 1514 | 1513 | 1512 | 1511 | 1510 | 1509 | 1508 | 1507 | 1506 | 1505 | 1504 | 1503 | 1502 | 1501 | 1500 | 1499 | 1498 | 1497 | 1496 | 1495 | 1494 | 1493 | 1492 | 1491 | 1490 | 1489 | 1488 | 1487 | 1486 | 1485 | 1484 | 1483 | 1482 | 1481 | 1480 | 1479 | 1478 | 1477 | 1476 | 1475 | 1474 | 1473 | 1472 | 1471 | 1470 | 1469 | 1468 | 1467 | 1466 | 1465 | 1464 | 1463 | 1462 | 1461 | 1460 | 1459 | 1458 | 1457 | 1456 | 1455 | 1454 | 1453 | 1452 | 1451 | 1450 | 1449 | 1448 | 1447 | 1446 | 1445 | 1444 | 1443 | 1442 | 1441 | 1440 | 1439 | 1438 | 1437 | 1436 | 1435 | 1434 | 1433 | 1432 | 1431 | 1430 | 1429 | 1428 | 1427 | 1426 | 1425 | 1424 | 1423 | 1422 | 1421 | 1420 | 1419 | 1418 | 1417 | 1416 | 1415 | 1414 | 1413 | 1412 | 1411 | 1410 | 1409 | 1408 | 1407 | 1406 | 1405 | 1404 | 1403 | 1402 | 1401 | 1400 | 1399 | 1398 | 1397 | 1396 | 1395 | 1394 | 1393 | 1392 | 1391 | 1390 | 1389 | 1388 | 1387 | 1386 | 1385 | 1384 | 1383 | 1382 | 1381 | 1380 | 1379 | 1378 | 1377 | 1376 | 1375 | 1374 | 1373 | 1372 | 1371 | 1370 | 1369 | 1368 | 1367 | 1366 | 1365 | 1364 | 1363 | 1362 | 1361 | 1360 | 1359 | 1358 | 1357 | 1356 | 1355 | 1354 | 1353 | 1352 | 1351 | 1350 | 1349 | 1348 | 1347 | 1346 | 1345 | 1344 | 1343 | 1342 | 1341 | 1340 | 1339 | 1338 | 1337 | 1336 | 1335 | 1334 | 1333 | 1332 | 1331 | 1330 | 1329 | 1328 | 1327 | 1326 | 1325 | 1324 | 1323 | 1322 | 1321 | 1320 | 1319 | 1318 | 1317 | 1316 | 1315 | 1314 | 1313 | 1312 | 1311 | 1310 | 1309 | 1308 | 1307 | 1306 | 1305 | 1304 | 1303 | 1302 | 1301 | 1300 | 1299 | 1298 | 1297 | 1296 | 1295 | 1294 | 1293 | 1292 | 1291 | 1290 | 1289 | 1288 | 1287 | 1286 | 1285 | 1284 | 1283 | 1282 | 1281 | 1280 | 1279 | 1278 | 1277 | 1276 | 1275 | 1274 | 1273 | 1272 | 1271 | 1270 | 1269 | 1268 | 1267 | 1266 | 1265 | 1264 | 1263 | 1262 | 1261 | 1260 | 1259 | 1258 | 1257 | 1256 | 1255 | 1254 | 1253 | 1252 | 1251 | 1250 | 1249 | 1248 | 1247 | 1246 | 1245 | 1244 | 1243 | 1242 | 1241 | 1240 | 1239 | 1238 | 1237 | 1236 | 1235 | 1234 | 1233 | 1232 | 1231 | 1230 | 1229 | 1228 | 1227 | 1226 | 1225 | 1224 | 1223 | 1222 | 1221 | 1220 | 1219 | 1218 | 1217 | 1216 | 1215 | 1214 | 1213 | 1212 | 1211 | 1210 | 1209 | 1208 | 1207 | 1206 | 1205 | 1204 | 1203 | 1202 | 1201 | 1200 | 1199 | 1198 | 1197 | 1196 | 1195 | 1194 | 1193 | 1192 | 1191 | 1190 | 1189 | 1188 | 1187 | 1186 | 1185 | 1184 | 1183 | 1182 | 1181 | 1180 | 1179 | 1178 | 1177 | 1176 | 1175 | 1174 | 1173 | 1172 | 1171 | 1170 | 1169 | 1168 | 1167 | 1166 | 1165 | 1164 | 1163 | 1162 | 1161 | 1160 | 1159 | 1158 | 1157 | 1156 | 1155 | 1154 | 1153 | 1152 | 1151 | 1150 | 1149 | 1148 | 1147 | 1146 | 1145 | 1144 | 1143 | 1142 | 1141 | 1140 | 1139 | 1138 | 1137 | 1136 | 1135 | 1134 | 1133 | 1132 | 1131 | 1130 | 1129 | 1128 | 1127 | 1126 | 1125 | 1124 | 1123 | 1122 | 1121 | 1120 | 1119 | 1118 | 1117 | 1116 | 1115 | 1114 | 1113 | 1112 | 1111 | 1110 | 1109 | 1108 | 1107 | 1106 | 1105 | 1104 | 1103 | 1102 | 1101 | 1100 | 1099 | 1098 | 1097 | 1096 | 1095 | 1094 | 1093 | 1092 | 1091 | 1090 | 1089 | 1088 | 1087 | 1086 | 1085 | 1084 | 1083 | 1082 | 1081 | 1080 | 1079 | 1078 | 1077 | 1076 | 1075 | 1074 | 1073 | 1072 | 1071 | 1070 | 1069 | 1068 | 1067 | 1066 | 1065 | 1064 | 1063 | 1062 | 1061 | 1060 | 1059 | 1058 | 1057 | 1056 | 1055 | 1054 | 1053 | 1052 | 1051 | 1050 | 1049 | 1048 | 1047 | 1046 | 1045 | 1044 | 1043 | 1042 | 1041 | 1040 | 1039 | 1038 | 1037 | 1036 | 1035 | 1034 | 1033 | 1032 | 1031 | 1030 | 1029 | 1028 | 1027 | 1026 | 1025 | 1024 | 1023 | 1022 | 1021 | 1020 | 1019 | 1018 | 1017 | 1016 | 1015 | 1014 | 1013 | 1012 | 1011 | 1010 | 1009 | 1008 | 1007 | 1006 | 1005 | 1004 | 1003 | 1002 | 1001 | 1000 | 999 | 998 | 997 | 996 | 995 | 994 | 993 | 992 | 991 | 990 | 989 | 988 | 987 | 986 | 985 | 984 | 983 | 982 | 981 | 980 |
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[illegible][illegible]

Mr. Crombie goes on to say in the same publication (page 3, paragraph 1), "This season's higher relative humidity combined with even distribution, in point of time, of the precipitation, very probably was responsible for the mitigated fire danger throughout the season.

will be 1931 or 1932 because the same conditions

"There were, on an average, fewer days with the relative humidity down to the danger point this season (1930) than last (1929) * * * the actual number of hours (of very low relative humidity) * * * was likewise found to be considerably less this year (1930) than last (1929)".

It seems probable that the much greater activity of the rust in the Ribes leaf in 1930 over what it was in 1929 is closely related to the greater amount of moisture in 1930.

Whether or not the relative humidity at the Newman Lake plot was higher in 1930 than in 1929 is not known. However, it is known that the relative humidity at Newman Lake in 1930 was decidedly higher than that at Spokane on the same days and hours. Throughout the summer season of 1930 sling psychrometer readings of relative humidities were taken on the plot, usually at 9 a.m., 12 noon, and 4 p.m. Readings from a hygrothermograph at Spokane were taken on the same days and hours. The averages for these readings are as follows:

Mean relative humidity, Newman Lake = 47 per cent.
Mean relative humidity, Spokane = 33 per cent.

Thus there was a difference of 14 per cent relative humidity in favor of Newman Lake.

C. General Pine Conditions, 1930

Analysis of the basic data on the white pine population showed that 52 pines which were alive in 1929 were dead in 1930. In an analysis of the causes of death it was seen that for pines 1-10 years old chewing by rabbits was the greatest single cause of death. Among the trees 11 years and older suppression was by far the largest single factor causing death. 44 of the 52 dead pines were in the suppressed crown class.

In order to obtain some indication of how constant a factor needle retention habit is, data on the number of years needles are born were compiled for the same trees in 1929 and 1930. The results of this study showed that there was little change in the needle-retaining habit of the trees in the two years. In both years the trees 11 years and older tended to hold their needles longest in the intermediate and suppressed crown classes.

as in 1929.

Mr. Campbell goes on to say in his own publication (page 1, paragraph 1). "This season's relative humidity conditions were even distribution, in fact of class, of the distribution, very probably, and responsible for the mitigated fire danger throughout the season."

"There were, on an average, lower days with the relative humidity down to 60-70 percent (1930) than last (1929) *** the actual number of hours (or days) for relative humidity *** was likewise found to be considerably less this year (1930) than last (1929)."

It seems probable that the more frequent activity of the wind in the time left in 1930 over what it was in 1929 is closely related to the greater amount of moisture in 1930.

Whether or not the relative humidity at the New York State fair was higher in 1930 than in 1929 is not known. However, it is known that the relative humidity at New York State fair is definitely higher than that at Watkins on the same days and hours. "Throughout the summer season of 1930 and approximately 100,000 visitors of relative humidity were taken on the first, second, and 3rd, 11 noon, and 4 p.m. readings from a psychrometer at Watkins were taken on the same days and hours. The averages for these readings are as follows: 1st, 2nd, and 3rd readings, 65, 65, and 65 percent, respectively. New York State fair = 45 percent. New York State fair, 1st, 2nd, and 3rd readings = 45 percent.

There were a difference of 10 percent relative humidity in favor of lower values.

A. Generalized Conditions, 1930

Results of the study of the data on the white pine population show that 33 places which were alive in 1929 were dead in 1930. In the majority of the cases of death it was seen that for three to 10 years old showing by rabbits and the growth of this class of trees. About the same 11 years and other vegetation was by the largest stage trees, however, dead. As of the 33 dead places were in the ungrazed crown class. In order to obtain some indication of how much of a factor rabbit population might be, data on the number of years rabbits are known were compiled for the same trees in 1929 and 1930. The results of this study showed that there was little change in the white-pine population of the trees in the forest. In both years the same 11 years old trees tended to be the most numerous in the landscape and the ungrazed crown class.

D. Pine Infection

All pine infection on the plot found thus far is chargeable to R. lacustre present and R. inermis removed during 1929 and 1930. It will be 1931 or 1932 before the sole effect of the R. lacustre in causing pine infection will be evident.

TABLE NO. 4

GENERAL INFORMATION ON PINE INFECTION, KILMAN LAKE INFECTION PLOT, 1930

| Item | 1929 | 1930 |
|---|--------|-----------|
| Acres worked | 23.4 | 36.2 |
| Total number of pines examined | 722.0 | 1,328.0 |
| Total number of pines infected | 63.0 | 113.0 |
| Per cent of pines infected | 9.0 | 8.5 |
| Total number of cankers found | *555.0 | 1,535.0 * |
| Average number of cankers per infected tree | 8.2 | 13.6 |
| Average number of cankers per thousand feet needle-bearing stem | 8.4 | 16.0 |
| Per cent of total needle-bearing stem borne by infected trees | 35.7 | 33.9 |
| Feet needle stem per average tree on plot | 88.2 | 72.3 |
| Feet needle stem per average infected tree | 343.7 | 233.5 |
| Feet needle stem per average non-infected tree | 62.3 | 52.2 |

*These totals include 21 cankers found and destroyed in May, 1930.

An examination of Table No. 4 reveals several interesting points:

1. Although there were 45 more pines found infected in 1930 than in 1929, there resulted a lower per cent of pines infected in 1930 than in 1929. The reason for this apparent contradiction lies in the fact that the pines on the 10.8-acre extension of the plot were so much less heavily infected than those on the old portion of the plot that the grand average was reduced. Had a comparison been made of the per cent of the same pines infected in 1929 and 1930, the infection in 1930 would undoubtedly have been much higher.

2. That intensification of pine infection occurred is shown by the fact that there were nearly 3 times as many cankers found in 1930 as in 1929, that the cankers per infected tree were more numerous, and that there were twice as many cankers per thousand feet of needle stem in 1930 as in 1929.

3. The per cent of needle-bearing stem borne by infected trees, 35.7 per cent in 1927, 33.9 per cent in 1930, is roughly 4 times the per cent of pines infected in 1930.

4. In both 1927 and 1930 it may be observed that the average infected pine had roughly 4 times as much needle stem as the average pine on the plot, and nearly 6 times as much as the average non-infected pine.

Pine infection found in 1927 and 1930 was studied in relation to crown class. By far the greatest amount of pine infection in both years occurred on trees 11 years old and older in the dominant crown class. Dominant trees are usually in the open exposed to blister rust and they have the largest amount of needle stem exposed. In Table No. 4 it may be seen that the amount of needle stem on infected trees was roughly 5 times that borne by non-infected trees. It is unfortunate that blister rust attacks most severely the best trees in a stand.

E. Analysis of Cankers.

All cankers found in 1930 were classified according to the year of growth infected and stage of canker development.

In addition to the cankers found in 1930 there were found and destroyed 21 cankers in May, 1928. An analysis of these 21 cankers quite plainly indicated that infection on the Sawman Lake plot originated in 1923.

An analysis of the 1,514 cankers found in 1930 showed that comparative large numbers of cankers were formed in 1927 and 1928. Owing to the fact that the early cankers of 1928 origin appeared at the same time as retarded cankers of 1927 origin the numbers formed in each year could not accurately be segregated.

Of the 1,514 cankers found in 1930, 76 were dead. Their arrangement according to year of growth infected showed that very probably many of them were of 1927 origin and had never produced acic. Most of these dead cankers occurred on small twigs which were easily killed.

SUMMARY

1. Although the increase in the number of Ribes bushes infected in 1930 over 1927 was roughly comparable to the increase in number of fruiting cankers, the increase in infected leaf surface, especially in

3. The percentage of seedling mortality was higher in infected than in non-infected plots in 1950, 1951 and 1952. In 1950, it was 14.1% in infected and 3.5% in non-infected plots.

4. In 1950 and 1951, the percentage of seedling mortality was higher in infected than in non-infected plots. In 1952, the percentage of seedling mortality was higher in non-infected than in infected plots.

5. The percentage of seedling mortality was higher in infected than in non-infected plots in 1950, 1951 and 1952. In 1950, it was 14.1% in infected and 3.5% in non-infected plots. In 1951, it was 11.2% in infected and 2.1% in non-infected plots. In 1952, it was 10.1% in infected and 1.2% in non-infected plots.

6. Analysis of Results

6.1. The percentage of seedling mortality was higher in infected than in non-infected plots in 1950, 1951 and 1952. In 1950, it was 14.1% in infected and 3.5% in non-infected plots. In 1951, it was 11.2% in infected and 2.1% in non-infected plots. In 1952, it was 10.1% in infected and 1.2% in non-infected plots.

6.2. The percentage of seedling mortality was higher in infected than in non-infected plots in 1950, 1951 and 1952. In 1950, it was 14.1% in infected and 3.5% in non-infected plots. In 1951, it was 11.2% in infected and 2.1% in non-infected plots. In 1952, it was 10.1% in infected and 1.2% in non-infected plots.

6.3. The percentage of seedling mortality was higher in infected than in non-infected plots in 1950, 1951 and 1952. In 1950, it was 14.1% in infected and 3.5% in non-infected plots. In 1951, it was 11.2% in infected and 2.1% in non-infected plots. In 1952, it was 10.1% in infected and 1.2% in non-infected plots.

6.4. The percentage of seedling mortality was higher in infected than in non-infected plots in 1950, 1951 and 1952. In 1950, it was 14.1% in infected and 3.5% in non-infected plots. In 1951, it was 11.2% in infected and 2.1% in non-infected plots. In 1952, it was 10.1% in infected and 1.2% in non-infected plots.

SUMMARY

1. Although the increase in the number of flies was not statistically significant, the percentage of seedling mortality was higher in infected than in non-infected plots in 1950, 1951 and 1952. In 1950, it was 14.1% in infected and 3.5% in non-infected plots. In 1951, it was 11.2% in infected and 2.1% in non-infected plots. In 1952, it was 10.1% in infected and 1.2% in non-infected plots.

telial production, was very much greater in 1930 than in 1929. In general, higher relative humidity conditions obtained in 1930 than in 1929, possibly accounting in part for the much greater Pibes infection in 1930.

2. Intensification of the rust on pines was more evident in 1930 than in 1929, in that in 1930 there were nearly twice as many trees infected and three times as many cankers present as in 1929.

3. The pine infection on the Newman Lake infection plot is chargeable to R. inermis removed in 1929 and R. lacustre which remains. Sufficient time has not yet elapsed to measure in pine infection terms the effect of R. lacustre alone. The effect of the removal of R. inermis will begin to be noticeable in the spring of 1931.

Work done in this vicinity in 1930 revealed the fact that very few active Pibes are now growing near the original infection center and consequently very few cankers of recent origin were found. The disappearance of the Pibes from the Newman Lake area has been attributed to the fact that an abundance of young cankers on older trees adjacent to the center of the activity of the one found to intensify and spread the disease. This study, which was made in October, 1930, was conducted to determine the amount of new infection on the plot in adjacent areas of equal size around the one Pibes bush found.

With the Pibes removed from the center, a square consisting of 16 squares was surveyed. Points were placed to mark the boundaries of each square. The pine infection was then counted and measured on a plot. Using the scale 5 inches = 1 foot, each square was being divided for more accurate measurement. The squares were numbered.

After the plotting and measuring of a pine, data were taken as to age, height, feet of sapwooding area, crown area and extent of infection for this time. The extent of infection was determined from the canker analysis made for each tree. This consisted of a classification of each canker according to its size or degree of development and the part of the growth on which it occurred.

From the field data, classification was made of the amount of infection in each square. The squares were classified as follows: 1. No infection. 2. Infection. In order to measure the infecting ability of the Pibes, the number of trees in each square was counted and the classification

partial protection, was very much greater in 1935 than in 1933. In
general, it has no effect on the condition of the soil in
1935, possibly and mainly in part for the much greater time interval
in 1935.

A. Investigation of the soil on which was made in 1935
then in 1935. In 1935 the soil was nearly the same as in 1935.
Interval and there is no very considerable change in 1935.

2. The same interval on the same soil was made in 1935. In 1935
to A. Interval was made in 1935 and in 1935. In 1935
the soil was not the same as in 1935. In 1935 the soil was
of A. Interval was made. The effect of the removal of A. Interval will be
to be collected in the soil of 1935.

3. The same interval on the same soil was made in 1935. In 1935
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the soil was not the same as in 1935. In 1935 the soil was
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to be collected in the soil of 1935.

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the soil was not the same as in 1935. In 1935 the soil was
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to be collected in the soil of 1935.

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the soil was not the same as in 1935. In 1935 the soil was
of A. Interval was made. The effect of the removal of A. Interval will be
to be collected in the soil of 1935.

6. The same interval on the same soil was made in 1935. In 1935
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to be collected in the soil of 1935.

8. The same interval on the same soil was made in 1935. In 1935
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the soil was not the same as in 1935. In 1935 the soil was
of A. Interval was made. The effect of the removal of A. Interval will be
to be collected in the soil of 1935.

ations, which SPREAD OF THE RUST: JULY, CHICO, WASH., 1930 earlier, and (2) those of R. L. Joy 1932. This study on the Junior Forester introducing the rust into the region, were destroyed. Further studies INTRODUCTION have been since 1924 on average tree, and per thousand feet of needle-bearing stem.

In 1926 a pine infection center was located about 7 miles northwest of Bremerton at Chico, Kitsap County, Washington. It was learned that a patch of infected Ribes nigrum bushes had been removed from a nearby farm in 1922. Scattered R. sanguineum, R. lacustre and R. divaricatum were found in this vicinity. Examination of this infection in 1926 and the analysis of cankers found in 1930 indicate the year of origin of this infection to be 1919 or earlier.

Scouting done in this vicinity in 1930 revealed the fact that very few native Ribes are now growing near the original infection center and consequently very few cankers of recent origin were found. The discovery in the stand of one R. sanguineum bush having 20 feet of live stem and an abundance of young cankers on only the adjacent trees suggested a study of the ability of this one bush to intensify and spread the disease. This study, which was made in October, 1930, was conducted to determine the amount of new infection on the pines in concentric zones of equal width around the one Ribes bush found.

stand of young timber on the hill, north-facing slope. Containing many NOTA DATA collection of the place.

With the Ribes bush as the center, a block consisting of 4-square chains was surveyed. String was used to mark the boundaries of each square chain. The pine locations were then plotted and numbered on map sheets, using the scale 5 inches equals one chain, each square chain being divided for more accurate mapping, into 100 acre squares.

After the plotting and numbering of a pine, data were taken on the age, height, feet of needle-bearing stem, crown class and amount of infection for this tree. The amount of infection was determined from the canker analysis made for each tree, which consists of a classification of each canker according to its stage or degree of development and the year of the growth on which it occurs.

From the field data, compilations were made of the amount of infection in each successive 1/10-chain wide circular zone around the Ribes bush. In order to evaluate the infesting ability of this bush the canker data of the trees in each zone were segregated into two classifi--

THE UNIVERSITY OF CHICAGO

1910-1911

1990 1991 1992 1993 1994

1990

1. The first of these is the fact that the majority of the cases of infection are reported from the United States and Canada. This is true of the cases reported from the United States and Canada, and also of the cases reported from the United Kingdom and the Commonwealth of Independent States. The fact that the majority of the cases are reported from the United States and Canada is not surprising, since these countries have the largest populations and the highest standards of living. The fact that the majority of the cases are reported from the United Kingdom and the Commonwealth of Independent States is also not surprising, since these countries have a long history of reporting cases of infection.

of equal width around the new lines was found. Determine the amount of new infection on the sides in comparison with the amount of new infection in the center in October, 1939, and calculate the width of the killing of the one line to intensity and spread the stem and an abundance of young conifers on only the old line was suggested discovery in the stand of one L. RADAMUS been having 30 feet of the and consequently carry the estimate of recent width was found. The very few native trees are now growing near the original infection center. Counting done in this vicinity in 1939 revealed the fact that

1990

For more accurate results, take 100 different specimens.

After the plotting and numbering of a line, data were taken on the age, height, feet of standing water, crown diameter and amount of intrusion for this line. The amount of intrusion was determined from the number analysis made for each line, which consists of a classification of each sample according to the degree of development and the year of the growth on which it occurs.

From the field data, conclusions were made of the amount of infection in each successive 100-ounce wine samples and the times drunk. In order to estimate the infectious ability of this wine the number rate of the virus in each wine was estimated into the following:

cations, which are: (1) the cankers on growth developed in 1922 or earlier, and (2) those on growth made since 1922. This division was made because in 1922 the *R. nigrum* bushes, probably responsible for introducing the rust into this region, were destroyed. Further classifications were made to show the number of cankers formed since 1922 per average tree, and per thousand feet of needle-bearing stem.

RESULTS

Compilations made to show the infection conditions on each successive 1/10-chain wide circular zone around the Ribes bush are shown in Table No. 1.

Although there is a fairly consistent depression in the per cent of trees infected per zone outward from the Ribes bush, this same condition is not obtained by a zone segregation of the cankers formed on 1922 and older growth. Where comparison was made of the cankers in each zone on growth developed since 1922, the percentages do show a consistent depression for the first eight zones or for a distance of 0.8 chain from the Ribes bush. The results for the next two zones show a decided increase in the per cent of cankers on the growth made since 1922. Explanation of this probably lies in the fact that a much larger number of pines fell in these two zones, most of which were in a dense stand of young timber on the moist, north-facing slope. Conditions there are, no doubt, more conducive to the inoculation of the pines.

The results from prorating the cankers on wood produced since 1922 according to the total number of trees in each zone and the number of thousand of feet of needle-bearing stem per zone are the most encouraging but still are very irregular. It is apparent that neither of these methods have resulted in the depression desired.

options, which are: (i) the country on growth level in 1911 or earlier, and (ii) those on growth level since 1911. The latter was made because in 1911 the A. B. Smith Survey, probably representative for the entire country, was published. The first classification was made to show the number of countries formed since 1911 and average size, and per thousand level of wealth-formation.

In 1911 a plan for the classification of the countries was made. The plan was approved by the Committee on the subject, and the following was the result:

Classification was made to show the initial classification on size. The classification was made to show the initial classification on size. The classification was made to show the initial classification on size.

Although there is a fairly substantial increase in the per cent of these selected but was obtained from the same source, this was not obtained in a same proportion of the countries formed in 1911 and after growth. The countries were made of the countries in 1911 and after growth. The countries were made of the countries in 1911 and after growth. The countries were made of the countries in 1911 and after growth.

The results from studying the countries on world produced since 1911 according to the total number of these in each zone and the number of countries of each of world-formation then are as follows: The results from studying the countries on world produced since 1911 according to the total number of these in each zone and the number of countries of each of world-formation then are as follows.

There are three groups of countries in the world, and these are: (i) the countries on growth level in 1911 or earlier, (ii) the countries on growth level since 1911, and (iii) the countries on growth level since 1911.

There are three groups of countries in the world, and these are: (i) the countries on growth level in 1911 or earlier, (ii) the countries on growth level since 1911, and (iii) the countries on growth level since 1911.

TABLE NO. 1

ANALYSIS OF INFECTION CONDITIONS BY ZONES AROUND ONE RIBES SACCUBUM
BUSH, CHICO, WASHINGTON, 1930

| 1/10th
Chain
Wide
Zone
Number | Pine Data | | | | Cancer Data | | | | |
|---|--------------|------------------------|--------------------------------|----------------------------------|-------------------------------|------------------------------------|---------------------------------|--|--|
| | No.
Exam. | Feet
Needle
Stem | % of
Trees
Infec-
ted | % In-
fected
Since
1922 | Total
Num-
ber
Found | % on
1922 or
Older
Growth | % on
Growth
Since
1922 | Number
Since
1922 Per
Ave. Tree | Number
Since
1922 Per
M. F. F. S. |
| 1 | 5 | 853 | 80.0 | 60.0 | 69 | 8.7 | 91.3 | 12.6 | 73.9 |
| 2 | 9 | 2,739 | 88.9 | 77.8 | 46 | 8.7 | 91.3 | 4.7 | 15.3 |
| 3 | 6 | 1,815 | 81.3 | 50.0 | 12 | 3.3 | 91.7 | 1.8 | 3.1 |
| 4 | 15 | 5,910 | 68.8 | 56.2 | 131 | 9.9 | 20.1 | 7.4 | 17.1 |
| 5 | 13 | 3,260 | 46.2 | 38.4 | 65 | 10.8 | 89.2 | 4.5 | 17.8 |
| 6 | 21 | 8,895 | 47.6 | 47.6 | 32 | 18.7 | 81.3 | 1.2 | 3.9 |
| 7 | 10 | 10,425 | 50.0 | 30.0 | 17 | 52.9 | 47.1 | 0.8 | 0.8 |
| 8 | 23 | 12,471 | 34.8 | 17.4 | 25 | 60.0 | 40.0 | 0.4 | 0.8 |
| 9 | 40 | 16,136 | 30.0 | 22.5 | 20 | 35.0 | 45.0 | 0.2 | 0.5 |
| 10 | 33 | 18,485 | 27.3 | 24.2 | 22 | 24.1 | 75.9 | 0.7 | 1.2 |
| Totals
or
Ave. | 176 | 81,789 | 44.3 | 34.7 | 446 | 17.7 | 82.3 | 2.1 | 4.5 |

*Feet needle stem.

CONCLUSIONS

Because of the fragility of the sporidia, which is the explanation of their short period of effectiveness, any single Ribes bush in a stand of white pine is limited in its ability as a disease spreading host. The maximum distance the disease can be spread from native Ribes under natural conditions probably varies from a few feet to one mile or more, depending on the various existing factors such as the location and condition of the host, status of the disease, weather, topography, and the association of other plant life. Therefore there should be a fairly regular depression away from the Ribes in the amount of pine infection caused by one bush.

Results obtained from the Chico study do show in each method of comparison, a decrease in the amount of infection, in the first and last zones and in general a decrease outward from the bush. It is evident that the area studied and therefore the zones are not sufficiently large to give the necessary data for a fairly regular depression. Further study of this and of other suitable areas will give much valuable information on the disease spreading ability of native Ribes in white pine stands.

REPORTING OFFICER: [REDACTED] DATE: [REDACTED]
[REDACTED] [REDACTED] [REDACTED]

[illegible]

And: 911-11-11-11

— 1072 —

caused by one bush.

Results obtained from the Office study to date in each method of comparison, a decrease in the amount of infection in the first and last years and in general a decrease obtained from the study. It is evident that the area studied and therefore the areas are not sufficiently large to give the necessary data for a fairly regular repetition. Further study of this and other suitable areas will give more reliable information on the disease spreading ability of cattle flies in this area.



LONG MEADOW INFECTION AREA, IDAHO

Photography by St. Sgt. H. M. Cowling. Pilot - Major C. V. Haynes,
 116 Photo Section, Washington National Guard, February 14, 1931

Approximate Scale: 0 200' 400' 600'

The white ribbon is the Potlatch Lumber Company's railroad, constructed during and after the disease survey was made. Just below the railroad may be seen Three Bear Creek flowing from the left and Long Meadow Creek flowing from the right. The junction of the two creeks may be seen at the lower right center. The infected area is outlined in brown. The three solid brown triangles represent the approximate locations of the centers originating in 1923.

BLISTER RUST INFECTION SURVEYS IN IDAHO, 1930

By

H. H. Putnam,

Associate Pathologist

INTRODUCTION

In the fall of 1930 the first blister rust infection survey was made in the West at Rhododendron, Oregon, a description of which is in the 1929 annual report. This proved to be such a good method of obtaining an impartial and quantitative expression of infection that the same procedure was followed in 1930 in studying well established infections in Idaho.

Without some sort of a quantitative basis it is quite impossible to make an accurate evaluation of an infection. By a haphazard examination of an infection, emphasis is apt to be placed at the center where the rust is heaviest. For this reason it is the human tendency to express the average infection in terms of its greatest severity. An impartial systematic survey, with strips at regular intervals results in a much more accurate statement of infection.

The uses of such an evaluation of infection are obvious. From it may be obtained an expression of the amount of pine infection chargeable to known amounts of known Ribes species. The rate of increase in cankers can be determined and made the basis for forecasting future development of the rust and the rate of damage to the pines. A disease survey is essential to the proper planning of a permanent infection study plot.

In table No. 3 there are shown the general findings of the disease surveys made in 1930.

PURPOSE

As already implied in the introduction the purpose of making a blister rust infection survey is to obtain an accurate, impartial quantitative expression of the status of the disease and its hosts.

METHOD OF WORK

The method in brief consisted in taking essential data on strips 0.2 chain wide at regular intervals through the infected area. On the Long Meadow and Deep-alk Creek areas a 4 $\frac{1}{2}$ cruise was made by locating strips at 5-chain intervals. On the St. Maries River and Cherry Creek areas a 2 $\frac{1}{2}$ cruise was run by spacing the strips 10 chains apart.

On each strip data were taken by one chain long transects on topography, pines, Ribes and the infection on both hosts. Fine data included crown class, height, age, D.B.H. feet of needle stem, years needles

REPORT ON THE INFECTION SURVEY IN 1930

By
H. N. Pritnam,
Associate Pathologist

INTRODUCTION

In the Fall of 1930 the first blatter rust infection survey was made in the West at Humboldt, Oregon, a description of which is in the 1930 annual report. This proved to be such a good method of obtaining an important and quantitative expression of infection that the same procedure was followed in 1931 in studying well established infections in Idaho.

Without some sort of a quantitative basis it is quite impossible to make an accurate evaluation of an infection. By a quantitative evaluation of an infection, emphasis is put on the place of the infection in the total life of the plant. For this reason it is the human tendency to express the average infection in terms of its greatest severity. An important systematic survey, with strips at regular intervals results in a much more accurate statement of infection.

The value of such an evaluation of infection are obvious. From it may be obtained an expression of the amount of plant infection characteristic to known amounts of known blatter species. The rate of infection in a certain area can be determined and made the basis for forecasting future development of the rust and the rate of damage to the plant. A disease survey is essential to the proper planning of a permanent infection strip plot.

PURPOSE

As already implied in the introduction the purpose of making a blatter rust infection survey is to obtain an accurate, important quantitative expression of the state of the disease and its hosts.

METHOD OF WORK

The method in blatter rust consisted in taking essential data on strips of 0.5 acres with at regular intervals through the infected area. On the Long Meadow and Deep-Mix Creek areas a 1/2 acre was used as testing strips of 0.5-acre intervals. On the St. Maries River and near Green areas a 1/2 acre was used by spacing the strips in checker board.

On each strip data were taken by one chain long transects on topography, place, time and the infection on both sides. When data included crown class, height, age, D.B.H., feet of needle stem, years needles

borne, and the number of cankers classified according to the year of growth infected and the canker stage. Data on ribs included species, feet of live stem, degree of shading, and infection expressed as a per cent and differentiated as to uredinal, telial and necrotic infection.

LOCATION AND AMOUNT OF WORK DONE

In Table No. 1 there are shown the locations of infected areas studied and the number of strips run.

TABLE NO. 1

EXTENT OF DISEASE SURVEYS, IDAHO, 1930

| Location of Infection Studied | Per Cent
Craze | Number
Strips | Number
Mileacres |
|--|-------------------|------------------|---------------------|
| Long Meadow Creek, T. 39 N., R. 1
E. Sec. 14 | 4 | 16 | 2,780 |
| Elk Creek, Deep Creek, T. 39 N.,
R. 2 E. Sec. 14 | 4 | 22 | 2,160 |
| St. Maries River, near Clarkia,
T. 42 N., R. 2 E., Sec. 5, 8-12 | 2 | 45 | 6,520 |
| Merry Creek near Clarkia, T. 42
N., R. 2 E. Sec. 25 | 2 | 17 | 1,780 |

RESULTS

In Table No. 2 there are shown the general findings of the disease surveys made in 1930.

borne, and the number of tumors classified according to the year of growth infected and the cancer stage. Data on Rhesus included species, test of live stem, degree of swelling, and infection expressed as a per cent and differentiated as to whether viral and necrotic infection.

ADD TO BOTTOM OF NOTEBOOK

TABLE NO. 1
The following table shows the results of the investigation of the cases of infection of the blood in the United States and Canada, 1910-1911.

[illegible]

| Location of Infestation | Number of Infested | Number of | Number of |
|--|--------------------|-----------|-----------|
| 1. 1st floor, 1st floor, 1st floor | 1 | 1 | 1 |
| 2. 2nd floor, 2nd floor, 2nd floor | 1 | 1 | 1 |
| 3. 3rd floor, 3rd floor, 3rd floor | 1 | 1 | 1 |
| 4. 4th floor, 4th floor, 4th floor | 1 | 1 | 1 |
| 5. 5th floor, 5th floor, 5th floor | 1 | 1 | 1 |
| 6. 6th floor, 6th floor, 6th floor | 1 | 1 | 1 |
| 7. 7th floor, 7th floor, 7th floor | 1 | 1 | 1 |
| 8. 8th floor, 8th floor, 8th floor | 1 | 1 | 1 |
| 9. 9th floor, 9th floor, 9th floor | 1 | 1 | 1 |
| 10. 10th floor, 10th floor, 10th floor | 1 | 1 | 1 |

RECEIVED

in Table No. 3 there are shown the General Findings of the disease surveys made in 1930.

TABLE NO. 2

GENERAL INFORMATION FROM DISEASE SURVEYS, 1930

| Item | Long Meadow | Elk-Deer
Creeks | St. Marie's
River | Merry
Creek |
|---|-------------|--------------------|----------------------|----------------|
| Number of acres cruised | 59.0 | 53.5 | 326 | 89 |
| Approximate number of acres of infected area | 47.6 | 50.0 | 364 | 11 |
| Type in which infection occurred | Upland | Stream | Stream | Stream |
| Age class of pines | 11-40 | 11-40 | 21-40 | 21-40 |
| Number of pines per acre on infected area | 754 (a) | 336 (a) | 84 (a) | 177 (a) |
| Total number of pines on infected area (calculated) | 36,800 | 16,800 | 22,176 | 1,947 |
| Number of pines examined on infected area | 1,552 | 612 | 403 | 33 |
| Number of pines infected on infected area | 338 | 152 | 46 | 6 |
| Per cent of pines infected on infected area | 18.1 | 25.0 | 11.3 | 13.2 |
| Probable year of origin of infection | 1923 | 1923 | 1923 | 1927 |
| Number of cankers found probably formed in year of origin | 11 (b) | 2 (c) | 1 | 7 |
| Total number of cankers found | 9,500 | 838 | 183 | 7 |
| Per cent increase in numbers of cankers formed since year of origin | | | | |
| Calculated total number of cankers on infected area | 144,478 | 21,167 | 18,700 | 0 |
| Average number of cankers per thousand feet of needle-bearing live stem | 130,000 | 16,950 | 9,400 | 350 |
| R. pestifer feet of live stem per acre | 28.8 | 12.6 | 1.8 | 2.1 |
| R. inaequalis feet of live stem per acre | 0.0 | 745.0 | 53,579.0 | 11,759.0 |
| R. irregularis feet of live stem per acre | 0.0 | 0.0 | 17,167.0 | 50.0 |
| R. lenticularis feet of live stem per acre | 0.0 | 1,197.0 | 0.0 | 0.0 |
| R. viscosus feet of live stem per acre | 275.0 (d) | 175.0 | 2.0 | 205.0 |
| R. lenticularis feet of live stem per acre | 205.0 (d) | 883.0 | 9,537.0 | 231.0 |
| Total Hibes feet of live stem per acre | 1,081.0 (d) | 2,997.0 | 85,286.0 | 12,364.0 |

- (a) The numbers of pines shown per acre are those on the infected area, stream type and timber type combined. The number of pines per acre in the timber type alone is much larger in each case.
- (b) The 11 cankers of 1923 origin shown are based on a much higher per cent cruise of each infection center than for the infection as a whole.
- (c) There 3 cankers of 1923 origin were found in the summer of 1929.
- (d) The feet of live stem of Hibes as shown are those estimated to be on the area before eradication, and to which infection on the pines was chargeable. Eradication work in 1923 reduced these feet of live stem to 341 per acre in 1930.

attention is called to certain points in Table No. 2.

1. The Long Meadow infection was the only one of the four which can properly be considered as chargeable chiefly to upland Ribes.

2. As judged by the per cent increase in numbers of cankers since the year of origin, and by the number of cankers per thousand feet of needle stem, it is apparent that infection was more severe at Long Meadow and at Elk-Deep Creeks, than at the other two infections. The per cent of pines infected does not show this same grading of infection centers with reference to severity, and in this case is obviously misleading.

3. On the Long Meadow area, the most severe infection known in Idaho, neither R. petiolare nor R. inerme were found. In both of the areas showing the least rust intensification, the St. Maries River, and Merry Creek areas, R. petiolare and R. inerme were both present, and the former Ribes species was abundant. There was an apparent negative correlation between Ribes species of high relative susceptibility and rust intensification on the pines.

4. That the abundance of Ribes alone was not the controlling factor in causing the intensification of pine infection may be observed. The severity of infection as measured by the cankers per thousand feet of needle stem is in inverse ratio to the amount of Ribes per acre. The area having the least quantity of Ribes per acre, the Long Meadow area, showed the largest number of cankers per thousand feet of needle stem. Conversely, the St. Maries River infection on which was found the smallest number of cankers per thousand feet of needle stem, showed by far the largest quantity of Ribes per acre.

5. The number of cankers per thousand feet of needle stem varied directly as the number of pines per acre on the infected areas. This fact is probably significant of the importance of the degree of association of pines and Ribes in intensifying the rust. The larger the number of pines per acre, the more closely is the association of Ribes and pines. In an upland type the distance between Ribes and pines is much less than in a well pronounced stream type. It has been pointed out that the greatest amount of intensification of the rust occurred at Long Meadow essentially an upland type infection.

No expression of Ribes infection is shown in Table No. 2. Only a small amount of Ribes infection was found in 1930. At Merry Creek no Ribes infection was found on the strips. At the other three places Ribes infection was very slight.

In Table No. 3 there are shown relative humidity per cents at the four points compared with those for the same hours and days at Revill Idaho.

TABLE NO. 3

COMPARISON OF AVERAGE DAYTIME RELATIVE HUMIDITY PER CENTS AT THE
FOUR PINE INFECTION CENTERS WITH COINCIDENT RELATIVE HUMIDITY PER
CENT READINGS AT BOVILL, IDAHO, 1930

| Place | Period | Number
of
Read-
ings | Average
Relative
Humidity
Per Cent
at In-
fection
Center | Average
Relative
Humidity
Per Cent
Taken at
Bovill
Same Time | Increase
in Rel-
ative
Humidity
Per Cent
Over That
at Bovill,
Idaho |
|------------------|-----------------------|-------------------------------|--|--|--|
| Long Meadows | Jul. 1 to Jul. 17 | 17 | 55 | 31 | +24 |
| Old-Deep Creek | Aug. 6 to Aug. 13 | 14 | 71 | 37 | +34 |
| St. Marias River | Jul. 26 to Jul. 29 | 7 | 59 | 33 | +26 |
| Merry Creek | June 29 to Aug.
10 | 42 | 68 | 40 | +28 |

The determination of the relative humidity per cents at the four infection centers was based on sling psychrometer readings taken at different times in the summer. As a basis of comparison, relative humidity per cent readings were taken from the records of the hygrothermograph at Bovill, the instrument nearest to all four infections.

As may be seen in Table No. 3 the relative humidity at each of the four infection centers was decidedly above the corresponding reading at Bovill. There is a fairly uniform difference in the four comparisons. If the intensification of rust on pines is considered to be chargeable to good moisture conditions, as at Long Meadows for example, it must also be admitted that moisture conditions were equally as favorable to rust development at the other three points.

To sum up briefly the important points brought out in Tables No. 2 and 3 it may be stated that moisture conditions were apparently equally favorable to rust development at each of the four infection points; that the species of Ribes and their amounts per acre showed no appreciable effect in causing rust intensification; that the degree of rust severity was directly proportional to the number of pines per acre. The larger the number of pines per acre, the more closely is the association between the Ribes and pines, and the greater the opportunity for pines to become infected from the closely associated Ribes bushes.

[illegible]

The investigation of the relative sensitivity for each of the different infection centers was based on using psychomotor readings taken at different times in the morning. In a series of four studies, relative sensitivity was found to be highest when the readings of the various centers were taken at the same time of day. This was found to be the case for all four centers.

As may be seen in Table No. 3 the relative humidity at each of the four levels is relatively more or less constant, as may be seen in Table No. 4. The relative humidity at each of the four levels is relatively more or less constant, as may be seen in Table No. 4. The relative humidity at each of the four levels is relatively more or less constant, as may be seen in Table No. 4.

to the fact that the amount of the investment in the four countries is not the same. It is not possible to make a direct comparison of the four countries on the basis of the amount of investment. The degree of development of each of the four countries is not the same. The amount of investment in each of the four countries is not the same. The amount of investment in each of the four countries is not the same.

The factor of association of Ribes and pines is of very great importance, particularly as in causing many cankers per tree. This fact is further brought out in map No. 1, on which is shown the Long Meadow infection data expressed as infection intensity zones based on the number of cankers per thousand feet of needle stem. It may be observed that at the centers of infection there were large numbers of cankers per unit of pine foliage, and that at increasing distances from the centers the number of cankers per thousand feet of needle stem decreased very rapidly.

CONCLUSION

An analysis of the results of the four disease surveys made in 1930 brings out the fact that when blister rust becomes established under favorable moisture conditions in a young stand supporting the *R. lacustre* and *R. viscosissimum* at the rate of 1,000 feet of live stem per acre, serious damage to pines will result. It is also indicated that the degree of association of Ribes and pines may become at least as important a factor in the development of rust as either the abundance or species of Ribes.

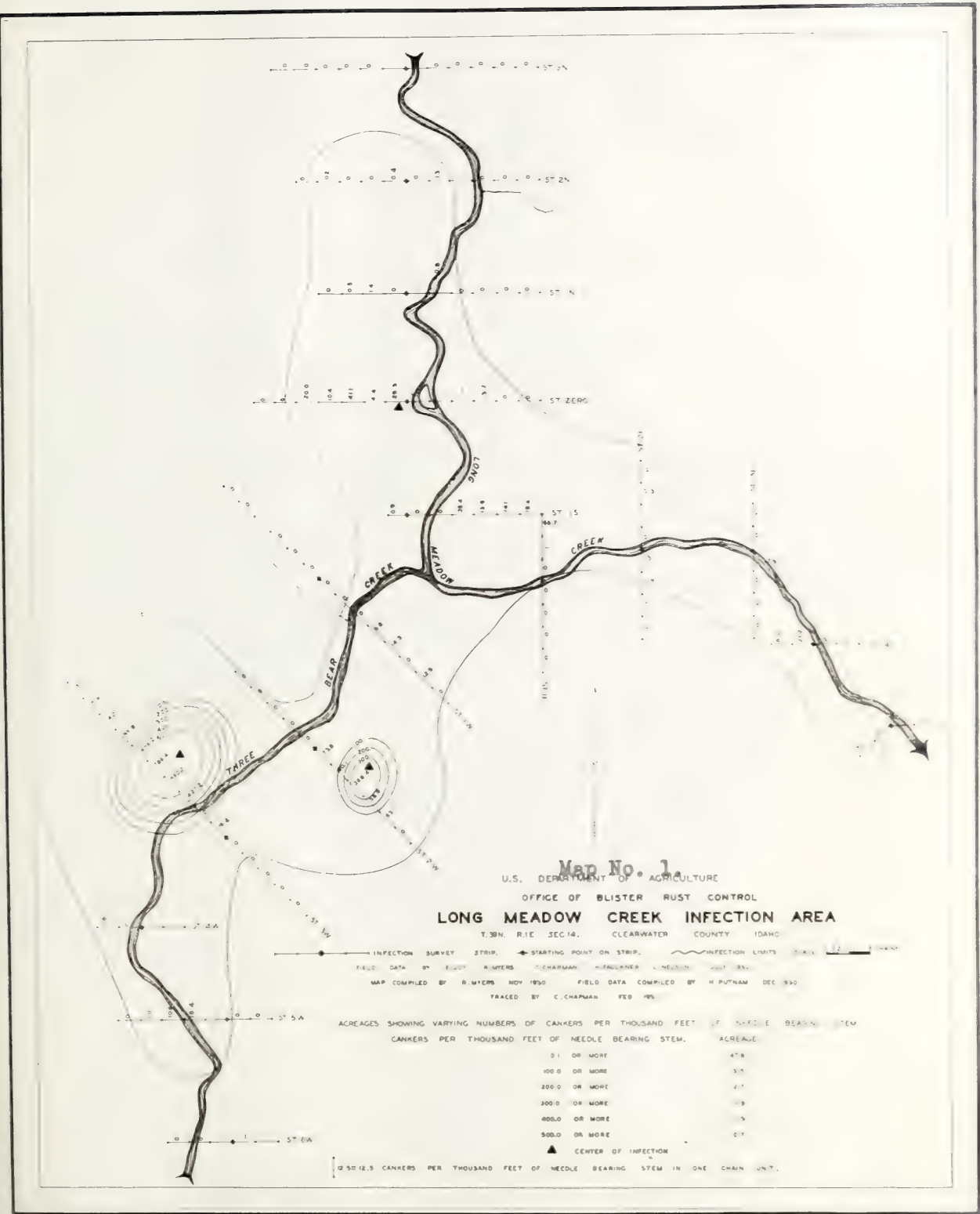


The factor of accumulation of disease and insects is of very great importance, particularly as in Canada many cankers per tree. This fact is further illustrated by the fact that in the United States the number of cankers per thousand feet of needle stem. It may be observed that in some cankers of infection there were large numbers of cankers per unit of pine foliage, and that at increasing distances from the center the number of cankers per thousand feet of needle stem decreased very rapidly.

CONCLUSION

An analysis of the results of the first three surveys made in 1922, 1923 and 1924 has led to the conclusion that the number of cankers per unit of pine foliage is a function of the distance from the center of infection. The number of cankers per unit of pine foliage at the rate of 1,000 feet of needle stem is a function of the distance from the center of infection. It is also indicated that the factor of accumulation of disease and insects per unit of needle stem is a factor in the development of the disease. The number of cankers per unit of pine foliage is a function of the distance from the center of infection.

of species of Ribes.



Annual Report 1930
 H. N. Putnam

SUMMARY OF EFFECTIVENESS OF CONTROL STUDIES, 1930

By

H. N. Putnam

Associate Pathologist

shown below:

The summary of results obtained from studies of the effectiveness of control is shown below:

1. The quantity of *Ribes* left after eradication is not a fixed amount but one which increases rapidly from year to year by the addition of new growth on old bushes and the formation of new bushes from seeds and sprouts.

2. In stream type, particularly where *R. petiolare* was abundant before eradication, seedlings of *R. petiolare* are often present in large numbers one and two years after the eradication work was done.

3. Studies made at Cheekye, B.C., show definitely that under conditions existing at Cheekye 1,250 feet does not constitute a safe width for a protection zone. Indications at Cheekye are that the pines may have become infected from sporidial sources a mile away.

4. Based upon a determination of the number of cankers per thousand feet of needle stem, studies now indicate that in the West *P. monticola* may be nearly 8 times as susceptible to blister rust as *P. strobus*.

5. Analysis of data gathered by infection surveys apparently indicates that the degree of association of pines and *Ribes* is a highly important factor in intensifying the rust on pines. This factor was much more important than either the relative susceptibility of the *Ribes*, or their amounts per acre. For example, at Long Meadow there were cankers at the rate of 23.8 per thousand feet of needle stem. These were chargeable to 1,081 feet of live stem of *R. lacustre* and *R. viscosissimum* per acre growing in very close association with the pines. By way of contrast, on the St. Maries River infection area there were only 1.8 cankers per thousand feet of needle stem chargeable to 85,285 feet of live stem per acre, chiefly *R. petiolare*. Thus on the St. Maries River area there were found 85 times as many *Ribes* per acre and only 1/15 as many cankers per unit of foliage as were found at Long Meadow. However, the *Ribes* on the St. Maries River area were in stream type and not so closely associated with pines as at Long Meadow.

6. A high relative humidity during the period of rust activity is very favorable to intensification of the disease.

STUDY OF EFFECTS OF CONTROL STUDIES, 1950

by
R. W. Putnam
Associate Pathologist

The summary of results obtained from studies of the effectiveness of control is shown below:

1. The quantity of Ribes left after eradication is not a direct amount but one which increases rapidly from year to year by the addition of new growth on old bushes and the formation of new bushes from seeds and sprouts.

2. In stream type, particularly where *R. pallidum* was abundant before eradication, seedlings of *R. pallidum* are often present in large numbers one and two years after the eradication work was done.

3. Studies made at Chequamegon, W.C., show definitely that under conditions existing at Chequamegon 1,500 feet does not constitute a safe width for a protection zone. Indications at Chequamegon are that the pines may have become infected from sporadic sources a mile away.

4. Based upon a determination of the number of cankers per thousand feet of needle stem, studies now indicate that in the West *E. monticola* may be nearly 2 times as susceptible to blister rust as *E. canadensis*.

5. Analysis of data gathered by infection surveys apparently indicates that the degree of association of pines and Ribes is a highly important factor in intensifying the rust on pines. This factor was much more important than either the relative susceptibility of the Ribes or their abundance per acre. For example, at Long Meadow there were cankers at the rate of 38.8 per thousand feet of needle stem. These were comparable to 1,081 feet of live stem of *R. fasciculatum* and *R. vitaceum* per acre growing in very close association with the pines. By way of contrast, on the St. Maries River infection area there were only 1.3 cankers per thousand feet of needle stem comparable to 85,283 feet of live stem per acre, chiefly *R. pallidum*. Thus on the St. Maries River area there were found 85 times as many Ribes per acre and only 1/15 as many cankers per unit of foliage as were found at Long Meadow. However, the Ribes on the St. Maries River area were in stream type and not so closely associated with pines as at Long Meadow.

6. A high relative humidity during the period of rust activity is very favorable to intensification of the disease.

COSTS

The costs of Project 4.2 for the calendar year 1930 are shown below:

During 1930 the district was under the supervision of the Western Office of Blister Rust Control and was under the supervision of the Western Office of Blister Rust Control.

TABLE NO. 1

COSTS OF PROJECT 4.2, 1930

| Item | Jan. 1 - June 30 1930 | July 1 - Dec. 31 1930 | Total |
|---------------------------|-----------------------|-----------------------|-------------|
| Salaries | \$3,942.96 | \$4,070.31 | \$8,013.27 |
| Travel & Subsistence | 839.01 | 2,201.39 | 3,100.40 |
| Equipment & Miscellaneous | 663.82 | 3.01 | 666.83 |
| Total | \$5,505.79 | \$6,274.71 | \$11,780.50 |

*\$469.55 of the equipment charge was for a Chevrolet truck, work and the relation of the various projects to the general plan of work; to install a realization of the massive blister rust which over white pine into the minds of blister owners, both public and private; to establish the necessity of preserving actual and potential forest assets in the minds of the forest service officials, lumber men and the general public; to supply forestry schools with information and material so that students may have a working knowledge of blister rust and its control, and to make contact with and give some knowledge of blister rust and its control to a portion of those not in direct contact with blister-rust-control work in order that general interest in and support for the control program may be secured.

Prior to 1928 educational work in the Spokane Office was relegated to a secondary place due to the fact that the project leader had several other projects which required a majority of his time. In 1928 a full time project leader was put in charge of the work, and a permanent assistant was appointed in October of the same year.

In 1929 a further expansion was deemed advisable, not in personnel, but in methods of work. This expansion took two forms of a larger amount of photographic work. In light of this development a

UNITED STATES GOVERNMENT

COSTS

The costs of Project 4-2 for the calendar year 1950 are

shown below:

TABLE NO. 1

| Item | Jan. 1 -
June 30
1950 | July 1 -
Dec. 31
1950 | Total |
|------------------------------|-----------------------------|-----------------------------|-------------|
| Salaries | \$7,262.00 | \$4,070.31 | \$11,332.31 |
| Travel &
subsistence | \$33.01 | \$3,301.39 | \$3,334.40 |
| Equipment &
miscellaneous | * 254.88 | 2.01 | 256.89 |
| Total | \$7,549.89 | \$7,373.71 | \$14,923.60 |

* \$254.88 of the equipment charges are for a one-year lease. The balance of \$2.01 is chargeable to the calendar year 1951.

4. Analysis of data gathered by infection surveys apparently indicates that the degree of association of plant and virus is highly important factor in determining the rate of infection. This factor was taken into account in the relative susceptibility of the plants or tissues examined per acre. For example, at Long Island plant virus was found at the rate of 25.5 per thousand feet of needle stem. These were comparable to 1,001 feet of live stem of *A. balsamea* and *A. canadensis* per acre. Growth in very dense association with the virus by way of contrast, on the St. Lawrence Island infection area, was only 1.8 canisters per thousand feet of needle stem. These on the 12,000 feet of live stem per acre, namely *A. balsamea*. These on the St. Lawrence Island were found to have as many virus as the 12,000 feet of live stem per acre of *A. balsamea* on Long Island. However, the data on the St. Lawrence Island were not as closely associated with virus as on Long Island.

5. A more relative analysis of the degree of virus infection is very important to the interpretation of the data.

EDUCATIONAL WORK, 1930

By

Kernit Miller

Agent

INTRODUCTION

During 1930 the educational program of the Western Office of Blister Rust Control was carried on in Washington, Oregon, California, Idaho and Montana. Work in other states consisted of supplying information when definite requests were received, with the exception of the material furnished to the National Parks in the West outside of the five states mentioned.

As in the past, the work in Montana, Oregon and California was done by, or under the direction of, the state leaders with the aid of material furnished by the Spokane Office. Treatment of the work in those states may be found in the reports of the state leaders. This report deals only with work done from the Spokane Office.

PURPOSE

Educational work is done largely with five groups: Blister-Rust workers, the Forest Service personnel, timber owners and operators, colleges and the general public. The purpose of the work, therefore, is to give the Blister-Rust workers the progress and results of the work and the relation of the various projects to the general plan of work; to instill a realization of the menace blister rust holds over white pine into the minds of timber owners, both public and private; to establish the necessity of preserving actual and potential timber assets in the minds of the Forest Service officials, timber owners and the general public; to supply forestry schools with information and material so that students may have a working knowledge of blister rust and its control, and to make contact with and give some knowledge of blister rust and its control to a portion of those not in direct contact with blister-rust-control work in order that general interest in and support for the control program may be secured.

SUMMARY

Prior to 1928 educational work in the Spokane Office was relegated to a secondary place due to the fact that the project leader had several other projects which required a majority of his time. In 1928 a full time project leader was put in charge of the work, and a permanent assistant was appointed in October of the same year.

In 1930 a further expansion was deemed advisable, not in personnel, but in methods of work. This expansion took the form of a larger amount of photographic work. In light of this development a

EDUCATION WORK, 1950

John J. Miller
J. J. Miller

1947

1. The above information was obtained from the files of the Federal Bureau of Investigation, San Francisco, California, and is being furnished to you for your information.

It is the duty of the Government to protect the rights of its citizens and to maintain the peace and order of the community. The Government is responsible for the welfare of its people and for the security of the nation. The Government is also responsible for the education and the health of its citizens. The Government is the guardian of the rights and liberties of the people and is the protector of the public interest. The Government is the source of the law and is the enforcer of the law. The Government is the defender of the nation and is the protector of the people. The Government is the provider of the public services and is the maintainer of the public order. The Government is the creator of the public policy and is the executor of the public will. The Government is the keeper of the public trust and is the guardian of the public good. The Government is the promoter of the public welfare and is the maintainer of the public peace. The Government is the defender of the public interest and is the protector of the public rights. The Government is the provider of the public security and is the maintainer of the public order. The Government is the creator of the public policy and is the executor of the public will. The Government is the keeper of the public trust and is the guardian of the public good. The Government is the promoter of the public welfare and is the maintainer of the public peace. The Government is the defender of the public interest and is the protector of the public rights. The Government is the provider of the public security and is the maintainer of the public order.

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is not a teacher education and training school, but is a school of work. This education gives the trainee a larger amount of knowledge than is given in the average

fully equipped photographic dark room was installed in the Spokane Office. H. A. Cowling, a photographer, was appointed July 1 as general assistant to the educational project leader.

The work accomplished during 1930 now properly falls under three general headings: (a) preparation of material; (b) distribution of material and information; (c) photographic work.

A. Preparation of Material

1. Specimens. The best method so far used for disseminating blister-rust information is by the use of actual specimens of the disease in all its stages. A working knowledge of blister-rust control cannot be developed without a thorough knowledge of the disease itself, which is best secured through the use of illustrative specimens.

Diseased Ribes leaves, showing both the telial and uredinial stages of the rust, are mounted on cards 4"x 6", covered with celluloid and bound with tape. Approximately 2,000 leaves of each stage were collected and pressed to be used in the mounts. In addition, 24 quarts of each stage were collected and pickled to be used in laboratory work.

A total of 268 uredinial and 260 telial mounts were made up during the year. Of that number 195 each of uredinia and telia were sent to the three state leaders, the remainder being supplied to educational institutions and individuals from the Spokane Office.

The pickled leaves were preserved in test tubes to be used for microscopic examination of spores in the class rooms of educational institutions of the West. Thirty-two tubes of each stage were supplied to the state leaders. For use from the Spokane Office they are put into test tubes as needed.

Cankers showing the five stages of development on pine, from early development to aecial production, were preserved in test tubes. 600 of them were used in demonstration boxes, 130 were sent to state leaders, and 133 are on hand for future use. In addition to the individual specimens nine quart jars filled with slightly larger aecial specimens were sent to state leaders, and a number were used in local demonstrations from the Spokane Office.

A number of trunk cankers from 18 to 24 inches in length, in large glass jars, were used in demonstration work, three of them being sent to state leaders.

All specimens sent out, whether for display purposes or classroom use, were so treated as to preclude the possibility of viable spores or mycelium remaining in the material. At the time of collection all

This report was prepared by the author and is intended to be used as a guide in the collection of material for the study of the life history of the American white sturgeon.

The following information was obtained from the author's collection of material for the study of the life history of the American white sturgeon.

1. Description of the material.

The material was collected from the American white sturgeon, *Acipenser transmontanus*, and is intended to be used as a guide in the collection of material for the study of the life history of the American white sturgeon.

The material was collected from the American white sturgeon, *Acipenser transmontanus*, and is intended to be used as a guide in the collection of material for the study of the life history of the American white sturgeon.

A total of 100 specimens of the American white sturgeon, *Acipenser transmontanus*, were collected from the American white sturgeon, *Acipenser transmontanus*, and is intended to be used as a guide in the collection of material for the study of the life history of the American white sturgeon.

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A number of specimens of the American white sturgeon, *Acipenser transmontanus*, were collected from the American white sturgeon, *Acipenser transmontanus*, and is intended to be used as a guide in the collection of material for the study of the life history of the American white sturgeon.

All specimens were collected from the American white sturgeon, *Acipenser transmontanus*, and is intended to be used as a guide in the collection of material for the study of the life history of the American white sturgeon.

specimens are treated with a killing solution. For pine specimens the formula is formaldehyde 2 per cent, glycerin 10 per cent, and water 88 per cent; for Ribes leaves, formaldehyde 5 per cent, glacial acetic acid 5 per cent and a 30 per cent solution of alcohol 90 per cent. The pine specimens and the Ribes specimens to be later preserved in test tubes remain in their respective solutions until sent out; the leaves to be used in dry mounts are immediately placed in plant presses.

Prior to 1930 all pine specimens were preserved in the killing solution, the tubes tightly corked and sealed with wax. Early in 1930 a gelatin formula was developed and is now exclusively used. The formula is 3 ounces granulated Bacto-gelatin, 30 ounces distilled water and one ounce formaldehyde. The hot solution is poured over the specimens and forms a clear, solid medium when it cools, being much more satisfactory than the liquid formerly used.

2. Demonstration boxes. For the past three years two types of demonstration boxes have been in use: a 7-stage box showing all stages of the rust on Ribes and pine, so arranged as to indicate the life cycle, with a one-page legend mounted under celluloid; and a 3-stage box showing the uredinial, telial and aecial stages with a brief legend. 96 of the 7-stage boxes were made up during 1930 of which 58 were sent to state leaders; and 120 of the 3-stage boxes were used during the year, 75 of them being made up in 1929. This type of box will not be used after the present supply is exhausted.

3. Blister rust albums. In the spring of 1929 an album was developed showing the important phases of blister rust work with an explanatory legend for each picture. Eight of these were made up to be used in blister rust camps. In 1930 one more album was made up and the nine were used in the Idaho camps. It is planned to develop more of these before the 1931 field season. They will include the latest information.

4. University sets. Under this heading a comprehensive set of photographs and bulletins was compiled showing the life cycle, spread of the rust, ultimate damage to pine and method of control. Legends were prepared giving more detailed information than is contained in the bulletins. New mimeographed publications are being prepared to replace out-of-date bulletins. 71 of these sets were sent out in 1930, 70 of them going to state leaders.

5. Bulletins. The bulletins used in educational material during 1930 were:

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1. The first of these is the fact that the Government has not been able to secure the necessary funds to carry out its policy of non-interference in the internal affairs of the Republic of China. This has been due to a variety of factors, including the fact that the Government has not been able to secure the necessary funds to carry out its policy of non-interference in the internal affairs of the Republic of China. This has been due to a variety of factors, including the fact that the Government has not been able to secure the necessary funds to carry out its policy of non-interference in the internal affairs of the Republic of China.

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1. The following are the names of the persons who have been identified as having been in contact with the subject during the period of the investigation:

Miscellaneous publication No. 26 - general bulletin dealing with blister rust.

Reprint from "The Timberman" - "White Pine Blister Rust - Its Cause and Control in the West".

Miscellaneous publication No. 27 - "Black Current Spreads White Pine Blister Rust".

Technical bulletin No. 87 - "White pine Blister Rust: A Comparison of European with North American Conditions".

Farmers' bulletin No. 1398 - "Currants and Gooseberries - Their Culture and Relation to White Pine Blister Rust".

Questions and answers - dealing with blister rust and its control.

6. Five-winged panels. These panels were revised in 1929 and were used in 1930 to replace the old ones in the hands of state leaders and collaborators. Two are used in the Spokane Office for use in public demonstrations, fairs, etc.

B. Distribution of Material and Information

1. Blister-Rust personnel. The first duty of the educational project is to keep the Blister-Rust personnel informed on all phases of the control work. The medium employed for this service is the Western Blister-Rust News Letter which was continued in 1930 along the same general lines as in 1929.

Articles printed in the News Letter are written on blister rust and allied forestry subjects by the permanent personnel of the Western Office with a few articles coming from outside sources. During the year all projects are reviewed and latest information supplied. The News Letter also serves as a forum for the discussion of new or untried methods of work. The News Letter was issued each month, averaged nine pages, and was sent to a mailing list of 80, most of whom are directly connected with blister-rust work. During the field season the mailing list was expanded to include all the temporary employees and the contents of the letter were of a less technical nature. Two of these summer News Letters were issued averaging 17 pages in length.

Each of the eradication camps was given a supply of educational material to give the temporary men some knowledge of the blister-rust problem and the control work being done. One 7-stage demonstration box, one album, a complete set of bulletins and a question and answer list were included in the camp sets.

2. U. S. Forest Service. No organized educational program was undertaken with Forest Service workers in 1930. A talk was given by the project leader before a meeting of the Rangers of the St. Joe National Forest in copying of maps, charts, and lantern slides and in showing the photo-

1. The first group of people who were arrested in the city of Moscow in 1937 were the members of the "Left Opposition" who had been active in the 1920s and 1930s. They were accused of being "enemies of the people" and of being "counter-revolutionaries".

Technical Bulletin No. 27 - "White Line Disease"
 Comparison of symptoms with other diseases
 Barnes, Vol. 1, No. 1981 - "White Line Disease"
 Barnes and Kellie to White Line Disease
 Barnes and Kellie - "White Line Disease"
 Barnes and Kellie - "White Line Disease"

3. Five-sided pencil. These pencils were tested in 1930 and were used in 1932 to replace the old ones in the hands of State teachers and college boys. Two are used in the Bureau Office for use in public demonstrations.

DATE: 1961-10-10

1. Medical Personnel. The first day of the educational course is to teach the Medical Personnel involved on all phases of the course. The medical personnel employed for this course is the Medical Personnel which are employed in the course, which is the same, which is the same.

[illegible][illegible]

U. S. Forest Service, as organized educational project and working with forest service workers in 1930. A letter was given by the United States Forest Service to the National Forest in 1930.

April. All supervisors and rangers were supplied with demonstration boxes in 1929. ^{Final work for} copies were made and 13 composite pages laid out for the next season.

Due to the fact that the new assistant was inexperienced in blister-rust control work, it was necessary for him to accompany the project leader on his field trips in order that he might become familiar with the work in all localities. Consequently the only educational work done with the Forest Service personnel was extemporaneous at chance meetings.

securing 507 negatives from smaller negatives.

3. General Publicity. Articles dealing with blister rust in all its branches appeared in newspapers in Wallace, Moscow and Lewiston, Idaho; Seattle and Spokane, Washington.

Thirteen lectures were given before the botany and zoology classes of Lewis and Clark High School.

A blister-rust demonstration, contained in three large cases with demountable legs, was developed for the Sportsmen's and Tourists' Fair at Spokane, Washington, in May and was also used at the Clearwater County Fair at Orofino, Idaho, and the Bonner County Fair at Sandpoint, Idaho, in September. This demonstration is self-contained and is easily set up by one man in a short time. It is supplemented with an automatic slide projector giving the complete story of blister rust and control methods in pictures and legends. The continuous slide program was valuable in attracting people to the demonstration, the majority of them giving some time to examination of the specimens and other material after they had seen all of the slides. Other material consisted of trunk cankers and smaller cankers in all stages of development, diseased Ribes leaves, colored pictures of the disease and pictures of control work. Bulletins were given to those desiring them.

C. Photographic Work

On July 1 work was started on the installation of the dark room. Enough work was done so that the dark room was available for use when the first field pictures were taken. Since July new equipment has been added and any photographic work can now be handled.

Each year pictures are taken to give a complete picture record of each project. In 1930, however, there was not enough time available to give close coverage to each line of work, but a representative list of pictures was secured and 115 new ones added to the files in the Spokane Office.

During the winter season photographic work consists of the copying of maps, charts, and tables for the annual report, making and coloring lantern slides and enlargements, and the photographing and

printing of special work for the various projects. In January, 50 copies were made and 16 composite pages laid out for the 1932 annual report.

A total of 3,783 prints was used during the year, exclusive of those printed for the annual report. This number includes all pictures ranging in size from 9x12 centimeters to 8x10 inches. In addition, approximately 50 enlargements were used, mostly as a means of securing 8x7 negatives from smaller negatives.

A large number of pictures were taken as an experiment in color correction photography, also a considerable number were taken to test the feasibility of photographing various kinds of field equipment in the preparation of an eradication field manual.

Expense charged to each project in 1931, with project cost statement.

RECOMMENDATIONS

All expenditures by 1931

In order that every project may be given ample time in which to secure all necessary photographs, the purchase of another 8x7 field camera is recommended. Plans for 1931 call for dividing our territory into two parts, H. M. Cowling to do educational and photographic work in one part and the project leader to take care of the other. That plan is not possible without another camera. Our work is scattered over too large a territory for one man to cover it properly.

of a special kind for the various objects. In January, 1901, the first of these objects was the "The Great Wall of China" and the second was the "The Great Wall of China". The first of these objects was the "The Great Wall of China" and the second was the "The Great Wall of China". The first of these objects was the "The Great Wall of China" and the second was the "The Great Wall of China".

A large number of objects were taken as an experiment in color photography. The objects were taken as an experiment in color photography. The objects were taken as an experiment in color photography. The objects were taken as an experiment in color photography.

EXPLANATION

In order that every project may be given equal time in which to secure all necessary photographs, the project of another day shall be recommended. The project of another day shall be recommended. The project of another day shall be recommended. The project of another day shall be recommended.

The project of another day shall be recommended. The project of another day shall be recommended. The project of another day shall be recommended. The project of another day shall be recommended.

EXPLANATION

The project of another day shall be recommended. The project of another day shall be recommended. The project of another day shall be recommended. The project of another day shall be recommended.

The project of another day shall be recommended. The project of another day shall be recommended. The project of another day shall be recommended. The project of another day shall be recommended.

The project of another day shall be recommended. The project of another day shall be recommended. The project of another day shall be recommended. The project of another day shall be recommended.

EXPENDITURES
By
WESTERN OFFICE OF BLISTER-BUSH CONTROL
Calendar Year 1930

Federal Expenditures

The following tabulations of Federal expenditures for the periods January - June, 1930, and July - December, 1930 summarize, by projects, the expenditures of the Western Office of Blister-Bush Control.

Expenditures have been classified under the several heads shown in the tabulations for the purpose of better analyzing items of expense charged to each project in preparing project cost statements. To further this objective office records show the classification of all expenditures by object.

| Project | Jan. - June | July - Dec. | Total | Sub-
Expense | Railroad
Fares,
Pullman,
Stage,
Air | Other |
|---------------------------|-------------|-------------|-----------|-----------------|---|-------|
| | | | | | | |
| 1. Blister-Bush Control | 34,024.32 | 34,024.32 | 68,048.64 | | | |
| 2. Blister-Bush Control | 6,000.00 | 6,000.00 | 12,000.00 | | | |
| 3. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 4. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 5. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 6. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 7. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 8. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 9. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 10. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 11. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 12. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 13. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 14. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 15. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 16. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 17. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 18. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 19. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 20. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 21. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 22. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 23. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 24. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 25. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 26. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 27. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 28. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 29. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 30. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 31. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 32. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 33. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 34. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 35. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 36. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 37. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 38. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 39. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 40. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 41. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 42. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 43. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 44. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 45. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 46. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 47. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 48. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 49. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 50. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 51. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 52. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 53. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 54. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 55. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 56. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 57. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 58. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 59. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 60. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 61. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 62. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 63. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 64. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 65. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 66. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 67. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 68. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 69. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 70. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 71. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 72. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 73. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 74. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 75. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 76. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 77. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 78. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 79. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 80. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 81. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 82. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 83. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 84. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 85. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 86. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 87. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 88. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 89. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 90. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 91. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 92. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 93. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 94. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 95. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 96. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 97. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 98. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 99. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |
| 100. Blister-Bush Control | 1,000.00 | 1,000.00 | 2,000.00 | | | |

REVENUE OFFICE OF ALABAMA
Annual Report 1930

General Information

The following table shows the general expenditures for the various departments - 1929, 1930, and 1931 - summarized, by objects, the expenditures of the various offices of the State.

Expenditures have been classified under the several heads shown in the table. The purpose of better classifying items of expense under the same project is to give a more accurate statement of the expenditures of the various offices of the State.

all expenditures by object.

TABLE NO. 1

FEDERAL EXPENDITURES, WESTERN OFFICE OF BLISTER RUST CONTROL
January 1, 1930 - June 30, 1930

| Project | Salaries | Expenses | Total | RECAPITULATION OF EXPENSES | | | | | | | |
|--|--------------|--------------|--------------|----------------------------|--------------------------------------|----------------------------------|---|-------------------------------|---|------------------------|------------------------------|
| | | | | Subsistence Expenses | Railroad Fares, Pullman, Stage, Etc. | Operation Personnel, Owned Autos | Cost of Transportation in Government Trucks | Other Transportation Expenses | Express, Freight, Trucking, and Packing | Supplies and Equipment | Other Miscellaneous Expenses |
| 1.1 Cultivated black currant location and eradication in cooperation with states | \$ 946.82 | \$ 322.35 | \$ 1,269.17 | \$ 102.43 | \$ 84.41 | \$ 119.14 | - | \$ 2.27 | \$ 30 | \$ 6.80 | \$ 1.10 |
| 2.2 Developing methods of Ribes eradication | | | | | | | | | | | |
| 2.22-1 - Method studies of Ribes eradication, Idaho | 6,028.82 | 4,748.50 | 11,077.32 | 2,422.21 | 2.42 | 521.30 | \$ 38.72 | - | 483.56 | 2,016.93 | 322.36 |
| 2.22-2 - Experimental re-eradication vicinity Bonville, Idaho | 150.00 | | 150.00 | | | | | | | | |
| 2.22-3 - Experimental re-eradication near "Alene National Forest, Idaho | 35.00 | | 35.00 | | | | | | | | |
| 2.25 - Experimental re-eradication | | | | | | | | | | | |
| 2.25-1 - California | 3,176.07 | 1,102.64 | 4,278.71 | 643.26 | 45.71 | 127.14 | 71.67 | 3.03 | 73.97 | 154.23 | 87.37 |
| 2.3 Developing and testing of Ribicides | | | | | | | | | | | |
| 2.3-1 Laboratory investigations | 4,230.102 | 4,045.34 | 8,275.44 | 511.11 | 45.40 | 127.86 | 21.80 | 53.04 | 155.78 | 2,888.53 | 124.92 |
| 2.3-2 Field tests | 1,137.61 | 1,833.48 | 2,971.09 | 213.70 | | | 2.45 | | 127.70 | 882.43 | 91.12 |
| 2.4 Studies in Ribes ecology | | | | | | | | | | | |
| 2.4-1 - Idaho | 2,714.43 | 1,456.65 | 4,171.08 | 452.24 | 14.43 | 54.07 | 16.89 | 7.91 | 14.16 | 523.19 | 206.95 |
| 2.4-2 - Idaho | 104.00 | 117.52 | 221.52 | | | | | | | 1.50 | - |
| 2.4-3 - Oregon | 352.05 | 604.15 | 956.20 | 161.37 | 3.81 | 30.43 | 15.39 | 2.65 | 29.36 | 551.25 | 31.75 |
| 2.4-4 - California | | | | | | | | | | | |
| 2.1 Control reconnaissance on Federal lands | | | | | | | | | | | |
| 2.1-1 - California | 912.21 | 430.46 | 1,342.67 | 240.47 | 24.45 | 7.16 | 33.67 | 3.57 | 37.17 | 50.15 | 46.10 |
| 2.2 Ribes eradication on Federal lands | | | | | | | | | | | |
| 2.2-1 - Stevensburg, Montana | 3,744.11 | 1,000.12 | 4,744.23 | 51.33 | 34.47 | 100.63 | - | 1.10 | 3.29 | 126.92 | 37.42 |
| 2.2-2 - Klam River Nursery, Washington | 284.80 | 136.32 | 421.12 | 125.00 | | | | .43 | 8.47 | 16.00 | 6.00 |
| 2.2-3 - Mt. Hood National Forest, Oregon | 533.13 | 1,114.11 | 1,647.24 | 434.11 | 43.75 | 27.31 | 17.06 | 4.70 | 73.41 | 196.82 | 55.50 |
| 2.2-4 - Plumas National Forest, California | 216.60 | 11.17 | 227.77 | 1.33 | 2.84 | | | | | 2.08 | - |
| 2.3 Ribes eradication in National Parks | | | | | | | | | | | |
| 2.3-1 - Mt. Rainier National Park, Washington | 305.43 | 150.74 | 456.17 | 45.11 | 47.51 | 31.72 | - | 2.80 | 6.19 | 21.31 | - |
| 2.3-2 - State Forestry Department, Montana | 117.70 | 57.13 | 174.83 | 62.65 | - | - | - | - | 4.45 | 14.05 | - |
| 2.3-3 - Clearwater Timber Protective Association, Idaho - Protective | 6,264.96 | 5,443.86 | 11,708.82 | 3,315.65 | - | 31.15 | 71.05 | - | 780.86 | 1,122.36 | 116.80 |
| 2.3-4 - Clearwater Timber Protective Association, Idaho - Protective | 6,837.44 | 6,146.40 | 12,983.84 | 3,379.31 | 8.00 | 32.82 | 68.42 | 24 | 708.92 | 1,823.05 | 130.44 |
| 4.1 Field studies, spread of the rust | | | | | | | | | | | |
| 4.1-1 - Idaho | 300.99 | 290.38 | 591.37 | 124.67 | 123.16 | 18.27 | 1.30 | 16.46 | - | - | - |
| 4.1-2 - Oregon | 286.00 | 153.32 | 439.32 | 104.65 | 24.52 | 1.76 | 1.76 | 33.53 | - | - | - |
| 4.1-3 - Washington | 133.00 | 607.23 | 740.23 | 88.36 | 4.46 | 31.77 | 7.00 | 83 | 476.61 | 5.46 | - |
| 4.2 Damage to pine studies | 3,392.86 | 1,364.07 | 4,756.93 | 405.53 | 301.57 | 113.89 | 36.22 | 40.35 | 3.97 | 649.35 | 117.60 |
| 5. Educational work, Spokane office and field | | | | | | | | | | | |
| 5.1 - Spokane office and field | 1,523.28 | 862.43 | 2,385.71 | 75.75 | 206.99 | - | - | .12 | 37.33 | 400.49 | 141.76 |
| 5.2 - Spokane office and field | | | | | | | | | | | |
| 5.3 - Supervision | 2,204.25 | 894.30 | 3,098.55 | 235.79 | 626.67 | - | - | 27.03 | - | - | 15 |
| 5.4 - Other supervision | 7,208.80 | 1,684.02 | 8,892.82 | 54.34 | 52.56 | - | 3.27 | 4.27 | - | - | 1,722.53 |
| 9.3 - Miscellaneous supplies and services paid on I/A | | | | | | | | | | | |
| 9.4 - Miscellaneous supplies and services paid on I/A | | | | | | | | | | | |
| 9.4-1 - Miscellaneous supplies and services paid on I/A | 1,162.39 | | 1,162.39 | | | | 49.67 | - | 31.20 | 699.49 | 382.03 |
| 9.4-2 - Miscellaneous supplies and services paid on I/A | 1,584.22 | | 1,584.22 | | | | | | 102.12 | 1,482.10 | |
| Total January 1 to June 30, 1930 | \$ 60,076.00 | \$ 36,036.36 | \$ 96,112.36 | \$ 13,571.78 | \$ 4,143.33 | \$ 1,755.27 | \$ 102.21 | \$ 1,190.74 | \$ 2,740.11 | \$ 14,134.40 | \$ 1,461.15 |

*includes purchase of new truck and of laboratory supplies and equipment.

**includes purchase of new truck for each project as indicated.

***includes salary and expenses of H. H. Putnam February to June while in East.

****includes fees of \$250.00 for purchase of micrograph and \$50.00 for purchase of calculating machine.

Amount Reported
M. L. W. World

TABLE No. 2

FEDERAL EXPENDITURES, FORESTRY OFFICE OF RIBES RUST CONTROL
JULY 1, 1930 - DECEMBER 31, 1930

| Project | Salaries | Expenses | Total | Subsistence Expenses | RECAPITULATION OF EXPENSES | | | | | | Other Supplies and Equipment | Miscellaneous Expenses | |
|--|-------------|-------------|-------------|----------------------|-------------------------------------|----------------------------|-------------------------------------|--|------------|------------|------------------------------|------------------------|--|
| | | | | | Railroad Fares, Pullman Stage, Etc. | Operation Personnel, Autos | Transportation in Government Trucks | Cost of Freight, Trucking, and Packing | | | | | |
| 2.2 Developing methods of Ribes eradication | | | | | | | | | | | | | |
| 2.22 - Method studies of Ribes eradication, June | \$0 | \$31.81 | \$5,259.62 | \$ 101.50 | \$ 12.70 | \$ 114.94 | \$ 16.84 | \$ 307.44 | \$ 362.38 | \$ 350.76 | | | |
| 2.26 - Experimental eradication, California | 5,356.84 | 1,612.22 | 6,969.06 | 1,052.26 | 108.64 | 191.97 | 18.32 | 77.69 | 94.13 | 44.01 | | | |
| 2.3 Developing and testing Ribicides and Barberricides | | | | | | | | | | | | | |
| 2.3.1 - Laboratory investigations, Ribicides | 2,136.62 | 3,481.34 | 11,615.01 | 557.28 | 275.50 | 380.35 | 64.28 | 70.90 | 1,832.04 | 186.92 | | | |
| 2.3.1 - Laboratory investigations, Barberricides | 1,912.70 | 923.15 | 2,835.85 | 250.03 | 50.60 | 5.81 | 7.31 | 136.95 | 351.84 | 24.79 | | | |
| 2.3.2 - Field tests of Ribicides | 2,954.56 | 1,036.23 | 4,001.11 | 472.50 | 6.21 | | | | 344.75 | 30.20 | | | |
| 2.4 Studies in Ribes ecology | 2,180.97 | 1,378.24 | 3,559.21 | 475.70 | 162.42 | 312.13 | 36.63 | 16.24 | 34.28 | 315.47 | | | |
| 2.42 - Idaho | 520.00 | 450.59 | 1,020.59 | 203.75 | | 26.10 | | | 7.20 | 1.95 | | | |
| 2.44 - California | 1,962.52 | 574.80 | 2,541.35 | 480.99 | 15.73 | | 55.70 | | 24.61 | 4.65 | | | |
| 3.1 Control reconnaissance on Federal lands | | | | | | | | | | | | | |
| 3.15 - California | 2,176.66 | 695.75 | 2,871.91 | 426.61 | 42.99 | | .25 | 184.52 | 13.85 | 12.78 | | | |
| 3.2 Ribes eradication on Federal lands | | | | | | | | | | | | | |
| 3.21 - Shreveport, Montana | 3,683.97 | 1,255.30 | 4,943.87 | 1,072.35 | | 214.55 | | | 2.00 | | | | |
| 3.22 - Clearwater National Forest, Idaho | 1,504.26 | 111.35 | 1,612.31 | 48.08 | 5.30 | | | | 39.40 | 16.90 | | | |
| 3.23 - Willa River National Forest, Washington | 1,504.26 | 111.35 | 1,612.31 | 48.08 | 5.30 | | | | 39.40 | 16.90 | | | |
| 3.24 - Mt. Hood National Forest, Oregon | 2,683.52 | 1,331.63 | 4,113.61 | 742.62 | | 306.25 | | 4.50 | 106.81 | 21.16 | | | |
| 3.3 Ribes eradication in National Parks | | | | | | | | | | | | | |
| 3.33 - Mt. Rainier National Park, Washington | 624.89 | 202.35 | 827.34 | 151.32 | 36.28 | | | 9.90 | 3.82 | 3.67 | | | |
| 3.34 - Crater Lake National Park, Oregon | 516.66 | 303.46 | 746.12 | 48.31 | 50.49 | 150.54 | | 4.12 | | | | | |
| 3.4 Cooperative Ribes eradication | | | | | | | | | | | | | |
| 3.41 - State Forestry Department, Montana | 787.25 | 272.69 | 1,040.45 | 272.60 | | | | | | | | | |
| 3.42 - Clearwater Timber Protective Association, Idaho | 9,538.49 | 2,400.34 | 8,938.63 | 1,468.73 | 76.64 | 31.78 | 97.60 | 5.40 | 317.13 | 307.34 | | | |
| 3.42 - Potlatch Timber Protective Association, Idaho | 7,618.42 | 1,793.53 | 5,412.01 | 820.36 | 5.30 | 68.33 | 32.86 | 18.05 | 528.12 | 289.68 | | | |
| 4.1 Field studies, spread of the rust | | | | | | | | | | | | | |
| 4.11 - Montana | 1,623.33 | 215.30 | 1,841.63 | 67.91 | | 140.00 | 7.39 | | | 3.00 | | | |
| 4.12 - Idaho | 765.33 | 312.68 | 1,098.01 | 184.17 | 3.65 | 113.47 | 3.49 | 7.70 | | .20 | | | |
| 4.13 - Washington | | 53.70 | 53.70 | 18.50 | 67 | 33.38 | | | 1.15 | | | | |
| 4.14 - Oregon | 1,691.99 | 1,132.23 | 2,828.22 | 279.60 | 17.35 | 177.80 | 266.94 | .94 | 18.45 | 13.89 | | | |
| 4.15 - California | 1,945.41 | 272.54 | 2,721.99 | 326.43 | 67.09 | 267.22 | 23.45 | 38.52 | 8.63 | 15.14 | | | |
| 4.2 Damage to life studies | 4,070.31 | 2,217.63 | 6,287.54 | 1,450.36 | 134.90 | 506.94 | 67.06 | 41.92 | 3.61 | 1.50 | | | |
| 5. Educational work, Spokane office and field | 1,699.92 | 1,243.41 | 2,943.39 | 237.58 | 176.56 | 151.20 | 19.79 | 19.80 | 605.32 | 31.49 | | | |
| 6. Maintenance of field office and miscellaneous expenses | | | | | | | | | | | | | |
| 6.1 - Supervision | 2,299.98 | 355.25 | 2,655.23 | 116.33 | 199.93 | | | | 47.14 | | | | |
| 6.2 - Office maintenance | 7,168.71 | 1,541.20 | 9,012.91 | 37.80 | | | 8.92 | | .20 | | | | |
| 6.3 - Miscellaneous supplies and services paid on I/A | | 516.79 | 516.79 | | | | 172.65 | 5.14 | 261.87 | 4.33 | | | |
| 6.4 - Miscellaneous supplies and services paid in Washington | | 24.34 | 24.34 | | | | | | 192.01 | | | | |
| Total, July 1 to December 31, 1930 | \$78,590.33 | \$28,416.09 | \$1,079,662 | \$12,253.21 | \$1,456.56 | \$3,408.54 | \$912.70 | \$556.62 | \$1,827.98 | \$4,902.11 | \$8,170.69 | | |

*Includes supplies and equipment for field and laboratory use.

**Expenditures made from the \$5,500 allotted to this office by the Office of Barberricide Eradication.

†Includes rental and operation of truck, Wenatchee, Wa., \$191.00.

††See also separate summary of expenditures from Association funds for these projects.

Outstanding freight and express items for various projects, estimated at \$150, not included in above totals.

Cooperative Expenditures.

The following table summarizes the expenditure of cooperative funds on Ribes eradication by the Clearwater and Potlatch Timber Protective Associations.

The Association funds were deposited as a special account in the U. S. Treasury and disbursed by the Western Office of Blister Rust Control.

TABLE NO. 3

SUMMARY OF BLISTER RUST CONTROL COOPERATIVE RIBES ERADICATION EXPENDITURES
BY THE
CLEARWATER AND POTLATCH TIMBER PROTECTIVE ASSOCIATIONS
July 1, 1930 - September 30, 1930

| Cooperating Agency | Pages | Expenses | Total | Subsistence Supplies | Transportation of Equipment and Supplies | Miscellaneous Supplies and Services |
|--|-------------|------------|-------------|----------------------|--|-------------------------------------|
| Clearwater Timber Protective Association | \$ 8,273.02 | \$1,726.98 | \$10,000.00 | \$1,308.01 | \$399.37 | \$19.60 |
| Potlatch Timber Protective Association | 8,647.49 | 1,352.51 | \$10,000.00 | 895.86 | 583.23 | 77.42 |
| Grand Total | \$16,920.51 | \$3,079.49 | \$20,000.00 | \$2,203.87 | \$982.60 | \$97.02 |

As shown above the allotments for each association for the field season of 1930 were expended in full during the period July 1, 1930 to September 30, 1930.

For Federal expenditures on these projects see projects 3.42-1 and 3.42-2 on Statements of Western Federal Blister Rust Control Expenditures January 1, 1930 to June 30, 1930 and July 1, 1930 to December 31, 1930.

Many variations of Ribes infection have been observed on the infected species of Ribes found in Idaho, California, and Oregon. Definite results cannot be expected until the next season of 1931. Late season observations in 1930 indicated that Ribes species, which are highly resistant to Ribes infection, are being killed by agents when sprayed with or exposed to the spores of Ribes. A method of spraying Ribes species with the spores of Ribes is being developed. Ribes species are being sprayed with the spores of Ribes.

Expenditures

The following table summarizes the expenditures of cooperative farms in 1930 as reported by the Director and National Farm Administration.

The expenditures were classified as a special account in the U. S. Treasury and reported by the National Office of Statistics.

TABLE NO. 2

STATEMENT OF THE NATIONAL CO-OPERATIVE FARM ADMINISTRATION
BY THE
DIRECTOR AND NATIONAL FARM ADMINISTRATION
July 1, 1930 - September 30, 1930

| Cooperative Farm | Expenditures | Total | Subsistence | Transportation of Equipment and Supplies | Miscellaneous |
|------------------------|--------------|-------------|-------------|--|---------------|
| Director | | | | | |
| Inspector | | | | | |
| Protective Association | \$ 1,730.00 | \$ 1,730.00 | \$ 1,730.00 | \$ 1,730.00 | \$ 1,730.00 |
| Director | | | | | |
| Protective Association | \$ 1,300.00 | \$ 1,300.00 | \$ 1,300.00 | \$ 1,300.00 | \$ 1,300.00 |
| Director | | | | | |
| Protective Association | \$ 1,300.00 | \$ 1,300.00 | \$ 1,300.00 | \$ 1,300.00 | \$ 1,300.00 |
| Grand Total | \$ 3,030.00 | \$ 3,030.00 | \$ 3,030.00 | \$ 3,030.00 | \$ 3,030.00 |

As shown above the expenditures for each association for the year 1930 were reported in full during the period July 1, 1930 to September 30, 1930.

For Federal expenditures on these projects see projects 2-13-1 and 2-13-2 on Statement of Federal National Farm Control Expenditures January 1, 1930 to June 30, 1930 and July 1, 1930 to December 31, 1930.

GENERAL SUMMARY

I. Delaying Spread of the Rust

A. Cultivated Black Currant Eradication.

California - Project completed. One planting of 9 bushes found in Riverside County. Re-working - one planting of six bushes located in San Mateo County, one planting of two bushes in Sacramento County.

II. Development of Local Control Practice

A. Re-eradication.

1. California - 5,825 acres, 87 per cent of the 1926 and 1927 eradication areas on the Stanislaus National Forest, were reworked. 180,909 bushes having 1,004,757 feet of live stem, an average of 31 bushes and 173 feet of live stem per acre, were pulled.

B. Development and Testing of Iridicides.

4.0 were 1. Chemical investigations summary.

a. Results of 1929 experiments. The toxic action of X and Y copper complex sprays were unsatisfactory on Ribes in Idaho, Oregon and California. It is evident that the complex compound is not stable enough under the influence of reactive plant constituents to permit translocation of the chemical into root tissue.

b. Field tests of Iridicides, 1930. Laboratory investigation and greenhouse tests to date suggested: (1) the use of buffered sodium chlorate and Atlacide sprays in place of sprays merely adjusted with dilute acid or alkali; (2) the use of copper complex, cadmium sulphate, cadmium chloride and zinc ammonium chloride as a crown or stem application, (3) pitch oil, Diesel oil and Edleanu extract containing as a solute varying amounts of furfural, pyridine, benzene, toluene and naphthalene.

Many variations of these methods were tested on the several species of Ribes found in Idaho, California, and Oregon. While definite results cannot be determined until the field season of 1931, late season observations in 1930 indicated that copper complex, cadmium sulphate, cadmium chloride and sodium chlorate are excellent killing agents when injected into or applied to incisions on stems or roots. A method of packing copper complex paste into the basal portions of R. inermis showed excellent top kill and merits further investigation. R. roezli injected with copper complex by means of a

Zerk pressure gun showed some resprouts. Pitch oil proved too irritating to the skin to warrant large-scale application. Diesel oil proved quite as effective as pitch oil. No releaving was observed on E. roezli which had been sprayed with Diesel oil. Dilute cadmium sulphate and cadmium chloride sprayed on E. inerme showed complete kill of live stem at the end of growing season. No conclusions could be drawn regarding increased toxicity of buffered sodium chlorate and Atlacide solutions.

c. Barberry investigations. In cooperation with the Office of Barberry Eradication investigations were initiated to develop chemicals toxic to barberry. Tentative results indicate that the barberry lends itself to a flexible program of chemical eradication being rather susceptible to chemicals applied as a spray and as a crown application in both liquid and solid form.

2. Field tests of chemicals - Clarcia, Idaho. Results of spraying in 1929 indicate that the toxicity of sprays increases with the advance of the season, the optimum effectiveness being from about July 25 to August 7 with a general falling off in toxicity after August 15; sodium chlorate sprays are more effective than Atlacide or the sodium chlorate-calcium chloride mixture on all species throughout the season, and show the smallest seasonal variation in toxicity; strongly acid sprays at pH 4.0 were less effective than more nearly neutral sprays at pH of 6.5 and 8.0.

C. Studies in Ribes Ecology.

1. Inland Empire. Data taken in a study of the organic mantle of the forest floor indicate that no important changes take place in the depth of either the duff or humus layers during the development of a timber stand from the pole stage to the mature. Ribes seeds must be located in the first thirty years' accumulation if, as previous data indicate, Ribes are not present in dense stands more than 30 years old. Tentative results of studies to locate Ribes seeds indicate that 30 to 80 per cent of the seeds stored in the organic mantle are in the humus layer awaiting favorable conditions for germination.

These field studies resulted in carefully controlled laboratory investigations of the various factors which control Ribes seed germination. Present results indicate that: (1) alternating temperature combinations are much better for germination than constant, since about 90 per cent of the seeds germinated were in the four alternate temperature combinations; (2) neutral peat is a more favorable germination medium than acid peat, as 93 per cent of the seeds germinated were in the neutral medium.

2. California. Permanent plots have not been established long enough to give definite information. Temporary plots indicate that: (1) 3-year R. roezli bushes produce few fruits, 4-year bushes bear heavy crops; (2) Ribes establishment begins immediately after logging; Ribes population increases for six years or more, optimum development being in third, fourth, and fifth years; (3) on a heavy burn Ribes establishment proceeds normally for two or three years after which the increase is reduced probably on account of heavy concentration of Ceanothus brush which follows a fire; (4) the average R. roezli bush increases from .1 foot to 33 feet of live stem over a 5-year period.

3. Oregon. Ecological studies on the whole have not shown any more than was shown in 1929. Under certain conditions grasses and herbs may play an important role in suppressing Ribes seedlings that come in after eradication.

III. Application of Local Control

A. Control Reconnaissance

1. California - Reconnaissance completed on 122,682 acres on Eldorado National Forest at a cost of \$0.0322 per acre.

B. Ribes Eradication on Federal Lands.

1. Clearwater National Forest. Three U. S. Forest Service camps, for which the Office of Blister Rust Control provided the technical supervision, and one methods camp worked 3,266 acres at an average cost of \$10.10. 36,745 acres were protected at a cost of \$0.898 per acre for the protection afforded by stream type eradication.

A. comparison of knapsack and power spraying carried on by the methods camp showed that 109 gallons per acre is the point at which the scope of knapsack spraying ends and that of power begins. As there are few areas on which more than 50 or 60 gallons of spray per acre are required, knapsack spraying methods should be used on all practical operations.

2. Mount Rainier National Park. 316,753 Ribes, 536.2 bushes per acre, were pulled from 559.4 acres at a cost of \$11.29 per acre. A pre-eradication survey in this region showed that 16,860 acres need to be worked for the protection of 7,645 acres of white pine type.

C. Ribes Eradication, Savenac Nursery.

Re-eradication work done on 564.2 acres, 200,191 Ribes, 354.8 per acre, were pulled at a cost of \$7.57 per acre.

Cutting, piling and burning brush done on 70 acres, the work on 30 acres of which was paid for by the U. S. Forest Service. Promising experiments were carried on with sowing seed for suppression of Ribes through the formation of turf.

D. Ribes Eradication in Oregon.

1. Still Creek - 17,357 Ribes having 360,381 feet of live stem were pulled from 674 acres, 100 acres of which was a recheck of stream type.

2. Wind River Nursery - 6,111 Ribes with 76,010 feet of live stem were eradicated from 413.3 acres including 77.3 acres reworked.

E. Cooperative Ribes Eradication.

1. Idaho.

a. Clearwater Timber Protective Association. 3,055 acres worked at a cost of \$7.62 per acre. 61,000 acres were protected at a cost of \$0.49 per acre for the high degree of protection afforded by stream type eradication.

b. Potlatch Timber Protective Association. 6,747.4 acres worked at a cost of \$4.37 per acre. 165,000 acres were partially protected by stream type eradication at a cost of \$0.19 per acre for protection.

2. Montana. In cooperation with the State of Montana 472 acres near Flathead Lake were worked at a cost of \$2.33 per acre. 79,371 Ribes, 168.2 per acre, were eradicated by the hand-pulling method.

IV. Field Studies and Collection of Field Data.

1. Spread of the Rust.

1. New pine infections.

a. Idaho - 11 centers of pine infection located; 4 near Headquarters and Pierce, Idaho, 1 on Clearwater National Forest, 4 in the vicinity of Elk River, Idaho, 1 near Clarkia, Idaho and 1 on the St. Joe National Forest.

b. Oregon - 2 infection centers - one on Boaring River in Clackamas County and one on Minto Creek near Independence Ranger Station in Linn County. The latter represents the farthest point south at which pine infection has been located.

During the winter and spring months, the work on 10 acres of wheat was done by the J. E. Brown family. The experimental work was done on 10 acres of wheat, and the results were as follows: through the treatment of the wheat with the experimental material, the yield was increased by 10%.

1. Soil Creek - 17,357 Acres of wheat were planted from 1904 to 1905. The yield was 100 bushels per acre.

2. Soil Creek - 17,357 Acres of wheat were planted from 1905 to 1906. The yield was 100 bushels per acre.

3. Soil Creek - 17,357 Acres of wheat were planted from 1906 to 1907. The yield was 100 bushels per acre.

4. Soil Creek - 17,357 Acres of wheat were planted from 1907 to 1908. The yield was 100 bushels per acre.

5. Soil Creek - 17,357 Acres of wheat were planted from 1908 to 1909. The yield was 100 bushels per acre.

6. Soil Creek - 17,357 Acres of wheat were planted from 1909 to 1910. The yield was 100 bushels per acre.

7. Soil Creek - 17,357 Acres of wheat were planted from 1910 to 1911. The yield was 100 bushels per acre.

8. Soil Creek - 17,357 Acres of wheat were planted from 1911 to 1912. The yield was 100 bushels per acre.

9. Soil Creek - 17,357 Acres of wheat were planted from 1912 to 1913. The yield was 100 bushels per acre.

2. New Ribes infections.

a. Idaho - Ribes infection located at 1 point on the Clearwater National Forest, at 6 points on the Clearwater Timber Protective Association lands and at 9 points in the St. Joe River drainage.

b. Montana - Infection found at 4 points, 1-1/2 to 3 miles from Savenac Nursery.

c. Oregon - Infection located at 2 points in Linn County on Thomas Creek and on Winto Creek and at 1 point in Clackamas County on Roaring River.

B. Effectiveness of Control-Plot Studies

1. Mayman Lake, Washington. In 1930 there were nearly twice as many trees infected and three times as many cankers present as in 1929. The increase in the number of Ribes infected in 1930 over 1929 was roughly comparable to the increase in number of fruiting cankers but the increase in infected leaf surface, especially in telio production, was very much greater in 1930 than in 1929. In general higher relative humidity conditions obtained in 1930 than in 1929, possibly accounting in part for the much greater Ribes infection in 1930.

2. Pysht, Washington. The results of the study of the relative susceptibility of Pinus monticola and P. strobus after 5 years subjection to the disease indicate that in the West the P. monticola is 7.8 times as susceptible as P. strobus. In 1928 this rate was determined as 2.9 and in 1929 as 5.7.

3. Cheekye, B.C. In 1930 a survey of the Ribes conditions in the vicinity of the plot revealed the fact that the source of pine-infecting spores was probably three-fourths mile to one mile northwest of the plot. Thus it is probable that at least a 1-mile wide protection zone would be needed at Cheekye and in comparable regions before the pines would be protected.

V. Educational Work

Educational work was carried on with Blister Rust personnel, Forest Service personnel, timber owners and administrators, educational institutions and the general public. Information was disseminated by the use of demonstration material, talks and papers and a monthly news letter.

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Volume 2 of 201-1, pages 3 & 4 have been collected - attached.

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